BUTZEL LONG GUST KLEIN & VAN ZILE

A PROFESSIONAL CORPORATION

ATTORNEYS AND COUNSELLORS

0: WMD (w/encl) -CC: RF

RA-RF

1650 FIRST NATIONAL BUILDING

DETROIT, MICHIGAN 48226

(313) 963-8142

TELEX 810-2215066

DIRECT DIAL NUMBER (3)3) 225-7075

JACK D. SHUMATE

1333 SEP

Pre-Remedial

BIRMINGHAM OFFICE SUITE 200 32270 TELEGRAPH ROAD BIRMINGHAM, MICHIGAN 48010 (3)31-258-1616

TELECOPIER (3131-258-1439

Detroit Office August 30, 1988

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Mr. Steve Lingle Director, Hazardous Site Evaluation Division U. S. Environmental Protection Agency 401 M Street, S.W. Washington, DC 20460

AUG 3.1 1988"

U. S. EPA REGION 5 OFFICE OF RELIGIONAL ALBERTATOR

National Priorities List

Update Number 7 Proposed Listing

Hi-Mill Manufacturing Company Property

Highland Township, Oakland County, Michigan

Dear Mr. Lingle:

This firm represents Hi-Mill Manufacturing Company and is transmitting herewith, on behalf of our clients, comments concerning and objection to the proposal to include the Hi-Mill Manufacturing Company property on the National Priorities List.

We have requested the Michigan Department of Natural Resources to review the scoring for this site also. I am advised by Mr. Gary Klepper, Chief of the Site Assessment Unit, Remedial Action Section, Environmental Response Division of the Michigan Department of Natural Resources that his staff is in the process of reviewing the scoring for this site. We are advised that the State of Michigan has not previously scored this site because initial scoring was done by EPA's consultant, Ecology and Environment.

The Michigan Department of Natural Resources advises me that it has not completed its review of the scoring. The Department is certainly not prepared at this time to endorse the conclusions on site scoring contained in the attached comments, but Department staff have indicated to us that they feel that there were significant errors in the initial HRS Consequently, the Michigan Department of Natural Resources may file comments, also, in the near future concerning the HRS score for this site.

Mr. Steve Lingle August 30, 1988 Page 2

Thank you for your consideration of the enclosed comments. If your staff should have any questions or if there is further information which may be of assistance in evaluating this submission, please feel free to call upon me or my associate, Mr. Robert Davis. My direct telephone number is (313) 225-7075 and Mr. Davis' is (313) 225-7042.

Very truly yours,

BUTZEL LONG GUST KLEIN & VAN ZILE

back D. Shumate

JDS:br

cc: Valdas Adamkus (with enclosures)
Gary Klepper (with enclosures)

COMMENTS and OBJECTIONS of HI-MILL MANUFACTURING COMPANY to PROPOSED LISTING OF HI-MILL MANUFACTURING PROPERTY on the NATIONAL PRIORITIES LIST

Hi-Mill Manufacturing Company ("Hi-Mill"), through its attorneys, Butzel Long Gust Klein & Van Zile, offers these comments on, and objections to, the proposed inclusion of the Hi-Mill property on the National Priorities List ("NPL") for action under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, ("CERCLA").

The Hi-Mill site (the "Site"), located in Highland Township,
Oakland County, Michigan, was proposed for inclusion on the NPL in
Update 7, 53 FR 122, page 23995, June 24, 1988.

Historical and Regulatory Background

Hi-Mill has been engaged in fabrication of tubular copper, aluminum, and brass parts at the Site since 1946. These operations principally involve cutting and shaping of metal tubing purchased from other manufacturers. Some process waste waters are produced by metal finishing operations.

Process waste waters were formerly discharged to two small, unlined lagoons adjacent to the production building.

In August, 1975, the Michigan Department of Natural Resources (MDNR) informed Hi-Mill that continued discharge of process waste water to the lagoons required a Groundwater Discharge Permit issued by MDNR pursuant to the Michigan Water Resources Commission Act, P.A. 1929 No. 245. Hi-Mill promptly applied for, and on October 31, 1975, obtained, the permit.

One of the conditions of the 1975 permit was that Hi-Mill minimize the amount of effluent discharged under the permit. Accordingly, Hi-Mill promptly engaged a consulting engineer to design and install a system to capture process waste water for disposal. By March 1, 1979, the new system was fully operational and has remained in operation since that date. Thus, since March 1, 1979, process waste water has been properly disposed off-Site and there has been no discharge to the lagoons.

In 1983, MDNR recommended that wastes remaining in the lagoons be removed and properly disposed off-Site. Hi-Mill promptly proceeded to drain the lagoons, dredged all sludge and silt down to the underlying clay, and back-filled the excavations with clean sand. All wastes removed in this operation were properly disposed off-Site.

Thus, by early 1984, Hi-Mill had completed source control measures recommended and supervised by MDNR.

MDNR undertook monitoring of the surficial aquifer at the Site, installing observation wells to a maximum depth of 6.9 feet. These wells were completed into perched water above a layer of low-permeability clay. In January, 1984, MDNR advised Hi-Mill by letter, which is attached as Exhibit 1, that further sampling would be conducted by MDNR in the spring of 1984. The letter expressed the hope that no further remedial action would be required, "Since the levels are not excessive and are believed to be contained within clay * *." The letter also advised that, after the MDNR sampling

in the spring of 1984, "Any additional analysis of the groundwater, deemed necessary, will then be required of you." (Emphasis added.)

MDNR requested no further investigative or remedial action of Hi-Mill; rather, MDNR nominated the Site for inclusion on the NPL. There has been disagreement within MDNR concerning the propriety of this nomination. MDNR's Southeast Michigan District Office, which has jurisdiction over the Site, advised against nomination of the Site for the NPL. The District Office noted the history of cooperation by Hi-Mill and recommended that MDNR should request the company to take any necessary action (see memorandum of Oladipo Oyinsan, dated October 13, 1986, attached as Exhibit 2).

Application of Hazard Ranking System

Hi-Mill submits that the Hazard Ranking System ("HRS") established in 40 CFR Part 300, Appendix A, has been inaccurately applied to this Site. The inaccuracies result from two principal errors in applying the HRS to the facts in the record:

1. Treating two discrete aguifers as one.

The record indicates that MDNR has documented a release of contaminants only to the perched water existing to a maximum depth of 6.9 feet. Further, MDNR has documented the existence of a confining layer of low-permeability clay beneath the perched aguifer.

Area water well logs show that the shallowest aquifer usable for water wells begins at a depth of 45 feet. Due to (1) the spatial separation of the perched

water and the first usable aquifer and (2) the presence of the low-permeability clay layer, these two aquifers must be evaluated as discrete aquifers.

The initial HRS scoring improperly provided combined treatment to the two aquifers, applying established facts about the perched water to the usable aquifer. This was done despite the fact that data in the record, resulting from tests of wells completed into the first usable aquifer, show that those wells meet Federal Drinking Water Standards.

2. Improper Evaluation of Resource Affected.

The resource affected is a shallow marshy area having a seasonally variable depth to a maximum of 2.5 feet. The marsh has value as a wetland, but has no value for recreational, commercial, or domestic purposes.

The initial HRS scoring package confused the marsh with Waterbury Lake, which does have recreational and, possibly, commercial and domestic value. Evidence in the record establishes, however, that there is no connection between the marsh and Waterbury Lake; indeed, MDNR used water samples from Waterbury Lake to establish background quality.

The effect of these two errors is more fully discussed in the report of Hi-Mill's environmental consultant, Techna Corporation ("Techna"), which is attached as Exhibit 3 and is incorporated by

reference in these Comments and Objections. The Techna report further identifies specific portions of the rule-making record which were either ignored or improperly used in the initial HRS scoring.

As noted in the Techna report, an accurate application of the HRS results in a score for this Site of 3.91 for the perched water and 23.16 for the first usable aquifer. Both scores are well below the score of 28.50 established by 40 CFR Part 300 as the minimum score for inclusion of a site on the NPL.

Significance of Errors in HRS Scoring of the Site

Proper HRS scoring of the Site is critical in this case because the Hi-Mill Site should not qualify as a CERCLA site.

We realize that achieving an HRS score of 28.50 is not the only way in which a site can become a CERCLA site, but it is the only mechanism relevant to this Site. The State of Michigan has not designated the Site as its top priority and the extraordinary circumstances are not present to apply CERCLA pursuant to 40 CFR 300.66(b)(4). Thus, the proper HRS scoring is vital.

The significance of this score was emphasized in <u>SCA Services</u> of <u>Indiana</u>, <u>Inc. v. Thomas</u>, 634 F.Supp. 1355 (N.D. Ind., 1986), when the Court held, at pages 1364-5:

"The regulatory structure established by EPA has created a dividing line between those properties that require remedial action and those which do not: only those properties scoring more than 28.50 on the HRS will be included on the NPL and slated for further attention. In effect, the EPA has created a definition for properties which are dangerous enough to warrant attention—properties with scores over 28.50. The

corollary is that property below this threshold is considered safe enough by the EPA so as not to warrant further action under a statute designed to protect the public from hazardous wastes."

Updating the NPL and screening a proposed site for inclusion on the NPL (including the HRS scoring procedure) is a rule-making procedure subject to the requirements of the Administrative Procedure Act ("APA"), SCA Services of Indiana, supra; U.S. Ecology v. Carlson, 638 F.Supp. 513 (C.D. Ill., 1986). It is therefore necessary that EPA follow its own rules and regulations in the scoring procedure.

EPA has recognized the importance of properly applying the HRS criteria. For example, in 49 FR 200, October 15, 1984, page 40321, the Agency observed that:

"In reviewing these submissions, <u>EPA</u>
<u>Headquarters conducts further quality</u>
<u>assurance audits to ensure accuracy</u> and
consistency among the various EPA and State
offices participating in the scoring."

(emphasis added)

This is necessary to assure that the Agency's determination to place a site on the NPL meets the APA standard that its action is not arbitrary and capricious. In this instance, it is essential that EPA Headquarters correct the HRS scoring for the Site to reflect all relevant evidence in the record.

The proper test in a case such as this was enunciated in Eagle-Picher Industries v. United States EPA, 759 F.2d 905 (D.C. Circ., 1985). The Court said, at page 921:

"Under the arbitrary and capricious standard we look to see if the Agency has examined

relevant data and has articulated a rational explanation for its action."

(emphasis added)

As demonstrated in the Techna Report (Exhibit 3), the initial HRS score resulted from a failure to consider some relevant data and misapplication or misconstruction of other data. This clearly violates the standard quoted above and requires correction by EPA Headquarters.

Conclusion

The Hi-Mill Site was improperly scored due to inaccuracies in application of the HRS and failure to consider certain relevant facts in the record. EPA should correct the scoring to a maximum of 23.16 and decline to place the Site on the NPL.

Under a proper application of the HRS, the Site does not justify an expenditure of the limited resources of EPA. If further action is appropriate at the Site, it will be undertaken by Hi-Mill under the supervision of MDNR. Hi-Mill has already assured MDNR of its continued cooperation.

Respectfully submitted,

By: BUTZEL LONG GUST KLEIN & VAN ZILE

Jack D. Shumate

By: A sold - A go

Attorneys for Hi-Mill Manufacturing Company

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NATURAL RESOURCES COMMISSION THOMAS J ANDERSON E R CAROLLO JACOB A HOEFER STEPHEN F MONSMA HILARY F SNELL PAUL H WENDLER

HARRY H WHITELEY

JAMES J. BLANCHARD, Governor

Groundwater Quality Div. 1120 W. State Fair Ave. Detroit, MI 48203

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING BOX 30028 -LANSING, MI 48909

RONALD O. SKOOG. Director January 9, 1984

Robert Beard Hi Mill Manufacturing Co. 1704 Highland Road Highland, MI 48031

SUBJECT: Lagoon Cleanup, Hi Mill Manufacturing, Oakland County (630375)

Dear Mr. Beard:

We have received and reviewed the analysis from the last sampling conducted December 5, 1983. They indicate the removal of the liquid and sludge has significantly reduced the levels of metals contained there.

The analysis conducted on the smaller lagoon show slightly elevated levels of Barium, Selenium and possibly Cyanide at the 6 foot level. Since the levels are not excessive and are believed to be contained within clay, no removal of the sludge will be requested, at this time.

In September 1983 the department observation wells along the south and west of your property were sampled. Unacceptable levels of metals especially aluminum and iron were indicated. This data will be compared to future samplings. The first of such samplings will be taken this spring. Any additional analysis of the groundwater, deemed necessary, will then be required of you. If the source of contamination has been eliminated the levels of metals in the groundwater should be reduced. If there is an indication of a continual source of contamination, more extensive studies will have to be conducted to locate the source. Recommendations and actions will then be required to eliminate that source. Barium, Cyanide and Selenium will be included in the next sampling to help verify the containment of the metals found in the smaller lagoon.

Monitoring will continue on the discharge point of the runoff from the roof. Elevated levels of copper, aluminum and iron were noted in the September sampling. There is some concern that metals are or have been escaping through the roof exhaust system. Such metals could then settle on the roof, mix with rain water and be discharged into the marsh area south of your facility.

Recommendation of a study of the effects of past lagoon overflows on Waterbury Lake is being considered. Such a study could result in further recommendations for remedial action.

Robert Beard January 9, 1984 page 2

As previously discussed, you have agreed to notify our office, by letter, when you have completed filling in the old lagoon, with clean fill. Please include any future plans for the area i.e. seeding, etc.

Your cooperation and efforts to clean up the lagoon contamination has been appreciated. If you have any questions, please do not hesitate to contact me. Thank you.

Sincerely, GROUNDWATER QUALITY DIVISION

Lynne King

DETROIT DISTRICT OFFICE

(313) 368-3335

LK:pf

cc: Merle Crow Drew Gabel Oscar Boyea Hakim Shakir Tom Maki

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

October 13, 1986

TO:

Steve Cunningham, SAU

FROM:

Oladipo Oyinsan, GWQD-Detroit

Re: Hi-Mill Mfg. Co.

SAS Location # 63-03N-07E-23AB

I made an inspection of the above facility on September 26, 1986 and talked to Mr. Richard Beard.

Facility does not discharge waste into the ground anymore. The old lagoon has been removed and filled by the company several years ago. It is their understanding that they have corrected their contamination problem.

It is my opinion that before recommending nomination to the National Priorities List (NPL), DNR should sample the monitoring wells installed on site and notify the facility of our intentions. Because they have been cooperative in the past, we should give them an opportunity to initiate any remedial actions necessary if they are willing.

Let us see if we can arrange a meeting with the facility within the near future. Give me a call to arrange for this at your convenience.

00:is

cc: D. Dennis

H. Shakir

V. Burgess

COMMENTS RELATING TO THE INCLUSION OF THE HI-MILL MANUFACTURING COMPANY SITE IN THE NATIONAL PRIORITIES LIST



Exhibit 3



Knowledge, and the Creativity to Use It

P.O. Box 1087

Ann Arbor, Michigan 48106

(313) 572-139(

COMMENTS RELATING TO THE INCLUSION OF THE HI-MILL MANUFACTURING COMPANY SITE IN THE NATIONAL PRIORITIES LIST

Prepared for:

Mr. Jack D. Shumate
Butzel Long Gust Klein & Van Zile
1650 First National Building
Detroit, Michigan 48226

Prepared by:

James M. Harless, Ph.D. President

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COMMENTS RELATING TO THE INCLUSION OF HI-MILL MANUFACTURING COMPANY SITE IN THE NATIONAL PRIORITIES LIST

1.0 INTRODUCTION

Hi-Mill Manufacturing Company (Hi-Mill) located in Highland Township, Michigan, has been nominated for action under CERCLA/SARA and inclusion in the National Priorities List as a result of evaluations performed by the USEPA under the CERCLA Hazard Ranking System (HRS). Elevated levels of metals have been measured in shallow perched water, surface water (adjacent marsh) and marsh sediments near the site by the Michigan Department of Natural Resources (MDNR).

The Hi-Mill site lies south of a major state highway and north of a small marsh/wetland (Appendix A). The company has fabricated tubular copper, aluminum and brass parts since approximately 1946. Process waste waters from metal finishing operations were discharged to unlined lagoons south of the production building until approximately 1978, at which time the discharges were terminated. The residual water and sludges were removed from the lagoons in 1983 under the oversight of the MDNR.

The results of several investigations undertaken by the MDNR between 1978 and 1984 indicated that elevated levels of metals were present in water and sediment samples collected from the wetland and in samples collected from a near-surface perched water strata at the site. A biological investigation of the wetland/marsh did not reveal evidence that flora or fauna had been harmed by the effluents.

In 1987 the USEPA calculated an HRS score of 49.54 for the site, and then initiated regulatory action under CERCLA/SARA. However, when that score was calculated, the scoring process did not include appropriate consideration and evaluation of all relevant data which were available to USEPA. As a result, there were inaccuracies and errors in the application of HRS scoring guidelines. In addition, the HRS scoring process failed to consider the reduction of environmental impairment risk through prior remedial actions. Therefore, the HRS score is higher than appropriate. When properly scored, it is clear that the subject site does not warrant USEPA actions under CERCLA/SARA. These conclusions are further explained in the following sections.

2.0 HRS SCORING

Review of the October 1987 HRS scoring package (Ref. 1) has revealed scoring inconsistencies and errors in both the Ground Water Route Work Sheet and the Surface Water Route Work Sheet. The ground water route score was mistakenly based on data from two different saturated zones, and the surface water score was partially based on an improper usage assumption for the affected surface water. The result of these inconsistencies and errors is a final HRS score (S_N) that is higher than warranted by the facts and circumstances at the Hi-Mill site. Discussions of the appropriate scoring for the two route work sheets and the Work Sheet for Computing S_N are presented below.

2.1 Ground Water Route Work Sheet

The October, 1987 Ground Water Route score (Sgw) was determined to be 84.62 (Ref. 1); however, this score was improperly assigned because data associated with two <u>different</u> subsurface, saturated zones were combined in the route evaluation. The two saturated zones in question, 1) perched water near the ground surface and 2) a deeper, usable aquifer 45° - 60° below ground level, must be considered separately because they are separated by low permeability clays (ref.1, pg. 3) and there is no evidence of conectivity between the zones.

The Line 1, "Observed Release", score of 45 was assigned for the perched water lying approximately two to six feet beneath the existing grade. This score was based on the results of a 1982 MDNR hydrogeological study (Ref. 2) performed at the site. Elevated levels of metals (Cr, Cu, Al, and Zn) were measured in the perched water layer lying south and southeast of the Hi-Mill property. According to the guidelines for using the HRS (40 CFR 300, App. A), this constitutes evidence of release to the perched water layer. Since the MDNR study did not investigate ground water below a depth of 6.9', the results of the study are not applicable to deeper saturated zones.

The scoring for Line 5, "Targets", was developed for deeper, usable groundwater supplies. Based on local drinking water well logs (Appendix D), these aquifers are in saturated zones that 1) lie between 45' and 60' deep and 2) lie at depths greater than 100', and they are separated from the contaminated perched water by intervening clay layers of low permeability. These ground water supplies are indeed used for drinking by many households and businesses within a three mile radius of the Hi-Mill site. There is currently no evidence to indicate that these aquifers are contaminated or that they can be contaminated by the "observed release" (metals in the perched water lying near the surface). On the contrary, there was evidence available at the time of scoring to show that the deeper, usable aquifers were not contaminated by the "observed release". Additional analysis data collected by the Michigan Department of Health (July 1988) confirms the continuing absence of contamination in these aquifers (see Section 2.1.2).

2.1.1 Perched Water as Aquifer of Concern

If the perched water layer is used as the basis ("aquifer of concern" - 40 CFR 300, App. A) for preparing the work sheet, then the "Observed Release" score of 45 on the October, 1987, HRS Work Sheet (Ref. 1) is valid.

The scores for the components of Line 4 (Ref. 1) are also valid, and the total line score is 22.

However, since this saturated zone is not and cannot be used for human consumption due to low quality and yield, the Line 5 "Ground Water Use" score, "Distance to Nearest Well/Population Served" score, and "Total Targets Score" must all be zero (0).

Multiplication of Lines 1, 4 and 5 then results in a value of zero (0) and a final S_{gu} score of zero (0).

2.1.2 Uppermost Usable Saturated Zone as Aquifer of Concern

If the uppermost usable aquifer, lying between 45' and 60' deep, is used as the basis for preparing the work sheet, the "observed Release" score must be zero (0) since there is no chemical evidence that this aquifer is contaminated. In fact, all available evidence indicates that it is not contaminated. Several samples of ground water from Hi-Mill's production wells have been collected and analyzed for metals during the period 1972 - 1988. The results of these analyses are summarized in the table below:

Date	Sampling Agency	Results
April, 1972	MDNR (Ref. 3)	Cu - 0.38 mg/l "All other parameters were normal."
·		-
April, 1978	MDNR (Ref. 4)	"No contamination of the company's well was indicated,"
July, 1988	Oakland County Health Department (Ref.5)	Concentrations of all metal species tested were less than Drinking Water Standards and MCL limits; since concentrations of the two detected VOA species are near detection limits and no QC samples were
/		analyzed, the VOA data is unreliable

These data show that each time samples from the wells have been analyzed, the concentrations of all metals have been below Primary and Secondary Drinking Water Limits and Maximum Contaminant Level limits; therefore, there is no evidence of contamination of the deeper aquifers, even near the source of the surficial contamination.

Since the score for Line 1 is zero (0), Lines 2, 3 and 4 must be evaluated. In Line 2, the "Depth to Aquifer of Concern" is 45° - 60° (Appendix B), resulting in a score of 2. The "Net Precipitation" is zero (0) based on a normal annual precipitation of approximately 32 inches (40 CFR 300, App. A, Figure 5) and a mean annual lake evaporation of 30 - 32" (40 CFR 300, App. A, Figure 4); thus the score for this component is also zero (0). The score for "Permeability of the Unsaturated Zone (or intervening geological formation" (40 CFR 300, App. A, 3.2) should also be zero (0) due to the presence of "low permeability clays" (Ref. 1, pg. 3) encountered by the MDNR at depths of 1' and extending beyond borehole termini at depths of 4.5° to 7' below the existing ground surface. Since the "Physical State" of the contaminant, waste water, is liquid, the score for this component should be 3. The total Line 2 score should then be 7.

The waste water lagoon at the site was not lined. Therefore, the score for Line 3 is 3.

The scores for the components of Line 4 (Ref. 1) are appropriate, and the total score is 22.

The score for Line 5, "Ground Water Use", would be 3 because the ground water is used for human consumption. The score for "Distance to Nearest Well/Population Served" has been determined to be 35. This score is based on the following data: 1) the distance to the nearest well

(on-site) is <2000°, and 2) based on local well logs (Appendix B), approximately 60% of the potential 13,604 people served by local ground water sources (Ref. 1) draw water from the "aquifer of concern" lying at a depth of 45° - 60°. Thus, the total Line 5 score should be 44.

If the final ground water route score is calculated as described in the work sheet, with the above values, the value of S_{out} is 39.49.

2.2 Surface Water Route Work Sheet

The October, 1987 Ground Water Route score (Sgw) was determined to be 13.54 (Ref. 1); however, this score is inaccurate because the improper score was assigned to Line 5, "Surface Water Use". All other line scores appear to be appropriate.

The surface water of concern is a marsh/wetland area lying southeast of the Hi-Mill facility; it lies with a State of Michigan's Highland Recreational Area. The wetland has a typical maximum depth of 2.5' (Ref. 6), but water levels may be highly variable (Appendix ... - Historical Aerial Photos). An aquatic organisms study conducted by the MDNR (Ref. 6) did not discover any fish in the subject marsh; this is consistent with the shallow, highly variable water levels in the marsh. Therefore, this surface water is not adapted, nor is used, for 1) commercial or industrial purposes, 2) irrigation ... or recreational activities such as "fishing, boating, swimming" (40 CFR 300, App. A, 4.5), or 3) drinking water.

Although the nearby Waterbury Lake could be used for recreational activities, there is neither evidence nor reason for suspicion that it is contaminated. Examination of aerial photographs (Appendix I) reveals no surface water connection between the marsh and Waterbury Lake. This conclusion was confirmed by MDNR investigators in a 1984 study (Ref. 6) of the site. This study also concluded that Waterbury Lake "was not impacted by Hi-Mill surface discharges"; in fact, sediments from Waterbury Lake were used as representative of background for comparison of chemical analysis data (Ref. 6).

Therefore, based on the 1) lack of recreational or commercial use of the marsh and 2) the absence of effect on other surface water bodies from the Hi-Mill discharges, the Line 5 "Surface Water Use" score should be zero (0). This would result in a Line 5 total score of 6. Multiplying Lines 2, 3, 4, and 5 would then result in a Line 6 value of 4356. The resulting S_{SW} score is 6.77.

2.3 Work Sheet for Computing S.

Revised values for S_{μ} have been calculated based on the more accurate assessment strategies and information presented above. The value for S_{sw} was assumed to be 6.77 for all calculations. Two different calculations of S_{μ} were performed using data from the two ground water assumptions described above. Thus, values were determined for the cases where 1) the perched water and 2) the usable, deeper groundwater was the "aquifer of concern". The results of these calculations are presented in the following table:

Aquifer of Concern	Sgm	S _{sw}	S _e	S _M
Mixed - 10/87 HRS	84.62	13.54	NA	49.54
Perched Water	0.0	6.77	NA	3.91
Usable, Deeper Aquifer	39.49	6.77	NA	23.16

Whereas the S_N value was calculated at 49.54 in the October 1987 HRS scoring, the values of S_N calculated from the more refined data presented herein are 3.91 and 23.16. In both determinations S_N are less than 28.5, the threshold value for CERCLA action consideration under normal circumstances. The only way that an HRS score of >28.5 can be obtained from the Hi-Mill work sheets is to assume that there has been a documented release to the aquifer at 45' - 60' below the ground surface; there is no evidence to support such an assumption. All evidence is to the contrary.

3.0 SITE ACTIVITIES AND CONDITIONS

Previous remedial activities at the Hi-Mill site have resulted in removal of the waste water lagoons, primary sources of metals contamination. In September 1983 the MDNR recommended that Hi-Mill remove and dispose of the remaining waste water and sludges in the lagoons (Ref. 7). This was performed in November 1983 with oversight by the MDNR. All sludges and sediments were removed down to clay, and the entire area was filled with clean fill (Ref. 8). All activities were apparently performed to the satisfaction of the MDNR.

Based on 1) the removal of the lagoons and related contaminated waters and sludges and 2) the lack of evidence for additional sources on-site, the Hi-Mill site does not appear to present an imminent danger to human health or the environment. Past activities appear to have resulted in potential contamination of shallow perched waters and the adjoining wetland.

4.0 CONCLUSION

The evidence does not support inclusion of the Hi-Mill site on the National Priorities List or implementation of USEPA actions under CERCLA/SARA. If the site is scored properly according to HRS guidelines, the HRS score is below the 28.5 threshold under all circumstances. Past remedial activities have removed major contaminant sources which could pose an imminent danger.

Hi-Mill has committed to perform an extensive site assessment program to fully characterize the extent of contamination in subsurface waters and in the adjoining marsh. If significant contamination is discovered, a remedial action program will be designed and implemented. All of these activities will be performed under the continuing oversight of the MDNR.

It thus appears that expenditure of time, effort and funds by the USEPA is not justified. These resources can be more effectively applied to sites which truly present a significant risk to human health and the environment.

5.0 TECHNA CORPORATION QUALIFICATIONS

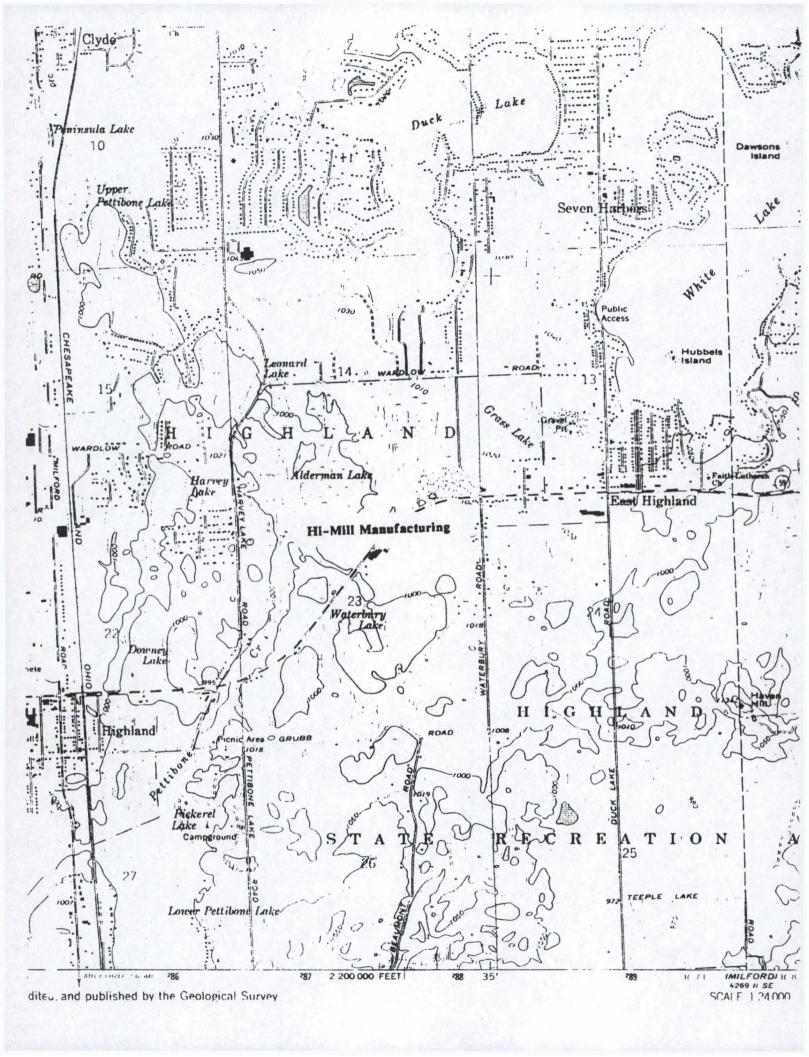
Techna Corporation is an environmental services firm specializing in site investigations, site remediation activities and environmental and chemical safety regulations compliance. Techna's highly trained and experienced staff of scientists and engineers have performed numerous site investigation and risk assessment programs involving the technical and regulatory issues described in this report.

Resumes of key technical staff are presented in Appendix L, and summaries of related projects conducted by Techna are attached in Appendix M.

REFERENCES

- 1. HRS Scoring Package for Hi-Mill Manufacturing dated 6/23/86 and with revision date of 10/13/87 (see Appendix B)
- 2. Sibo, Kathleen, "A Hydrogeological Study of the Vicinity of HiMill Manufacturing, Highland, Michigan", Michigan Department of Natural Resources, August 31, 1982. (see Appendix D)
- 3. Wilson, Ron, Interoffice Communication to Problem Evaluation Committee, Michigan Department of Natural Resources, March 1, 1978. (see Appendix E)
- 4. Grant, James and Richard Lundgren, "Investigation of Hi-Mill Manufacturing Treatment Facility, Vicinity of Highland, Michigan, April 26, 1978," Michigan Department of Natural Resources, November 14, 1978. (see Appendix F)
- 5. Parsons, Julie M., Letter to Mr. Dick Beard Detailing Results of Process Well Testing at Hi-Mill Manufacturing Company, Michigan Department of Public Health, August 22, 1988. (see Appendix G)
- 6. Surface Water Quality Division, "A Biological and Water and Sediment Chemistry Survey of Waterbury Lake and Adjacent Marsh, Oakland County, Michigan, April 26, 1984," Michigan Department of Natural resources, April 26, 1984. (see Appendix H)
- 7. King, Lynne, Letter to Mr. Bob Beard Concerning Recommendations for Remedial Action at Hi-Mill Manufacturing Company, Michigan Department of Natural Resources, September 8, 1983. (see Appendix J)
- 8. Lee, Lonnie, "Site Description/Executive Summary," Michigan Department of Natural Resources, October 11, 1984. (see Appendix K)

APPENDIX A SITE LOCATION MAP



APPENDIX E

HRS SCORING PACKAGE (REF. 1)

Facility name: Hi - Mill Many facturing
Location: 1074 Highland Rel., Highland, ME 18031
EPA Region: FIVE
Person(s) in charge of the factory. Mr. Robert Board - President Iti-Mill
Name of Reviewer, Paul Andersen (FIT) General description of the facility: Martileen J. Gody (FIT) Date: 6123/86
(For example: landfill, surface impoundment, pile, container, types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, esc.)
waste water from the manufacture of aluminum,
copper and brass parts was deposited in an on-
site seepage lagoon. The groundwaterhas been con-
taminated with copper and an adjacent marshy area
has also been contaminated due to overflows from
the lagoon wastewater and sludge have been remucal
and the lagoon is nowfilled with sund.
Scores: S _M = 49.54(S _{GM} = \$4.62 S _{GM} = /3.54S _B = O)
SFE = NA
\$pc ● O

FIGURE 1 HRS COVER SHEET

point E. Po esten

			Ground Water Route Work Sheet	1			
	Rating Factor		Assigned Value (Circle One)	Multi- plier	Score	Mex. Score	Ref. (Section)
0	Observed Release		0 45	1	45	45	3.1
			n a score of 45, proceed to line 4. n a score of 0, proceed to line 2.		_		
2	Route Characterist Depth to Aquifer		0 1 (2)3	2		8	3.2
	Concern Net Precipitation Permeability of t	he	(A) 1 2 3 0 1 2 3	1		3	
	Unsaturated Zo Physical State	ne	0 1 2 3	1		3	
	·		Total Route Characteristics Score		NA	15	
13	Containment		0 1 2 3	1	N/A	3	3.3
a	Waste Characteris Toxicity/Persiste Hazardous Wast Quantity	ence	0 3 6 9 12 15 (B) 0 1 2 3 (4) 5 6 7 8	1	18	18	3.4
			Total Waste Characteristics Score		22	26	
3	Targets Ground Water U Distance to Neal Well / Population Served	rest	0 1 2 3 0 4 6 8 10 12 16 18 20 24 30 32 35 49	3 1	9.40	9	3.5
				·	· 	·	
			Total Targets Score		49	49	
<u></u>			1 × 4 × 5 2 × 3 × 4 × 5		48510	57,330	
7	Divide line 6 b	y 57.330	and multiply by 100	S _{Çw} -	84.6	,2	

FIGURE 2
GROUND WATER ROUTE WORK SHEET

16,2

Surface Water Route Work Sheet											
	Rating Factor		Assigne (Circle		Muith- plier	Score	Max. Score	Ref. (Section)			
	Observed Release		0	45	1		45	4.1			
	If observed release	-									
2	Route Characteristi Facility Slope and		ng (0) 1 2	3	1	0	3	4.2			
	Terrain 1-yr. 24-hr. Rainta Distance to Neare		0 1 2	3	1 2	26	3 6				
	Water Physical State		0 1 2	①	1	3	3				
		Т	otal Route Cha	racteristics Sc	ore ·	11	15				
3	Containment		0 1 2	③	1	3	3	4.3			
4	Waste Characteristi Toxicity/Persister Hazardous Waste Quantity	nce	0 3 6 0 1 2	9 12 15(18) 3 (4) 5 6	7 8 1	18 4	. 18 . 8	4.4			
		To	otal Waste Cha	racteristics Sc	ore	22	26				
3	Targets Surface Water Us Distance to a Ser Environment		0 1 (Ø ;	3	6	9	4.5			
	Population Server to Water Intake Downstream	d/Distance	1 12 18	6 8 10 18 20 32 35 40	1	ప	40				
			Total Tar	pets Score	-	12	55				
हा		nulliply 1 ultiply 2	x 4 x 5 x 3 x 4			8712	64,350	· · ·			
7	Divide line 6 by	64,350 and	d multiply by 1	00	S _{sw} =	13.5	74				

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

28 3/2

			Air Ro	oute Work S						
	Rating Factor			ned Value de One)		Mülti- plier	Score	Max. Score	Ref. (Section)	
D	Observed Release		0	45		1	0	45	5.1	
	Cate and Location									
	Sampling Protocol					·				
	If line 1 is 0, 11 line 1 is 45,		Enter on line							
2	Waste Characteris Reactivity and Incompatibility	tics	0 1	2 3		1,		3	5.2	
	Toxicity Hazardous Waste Ocantity	1	•	2 3 2 3 4 5	6 7 8	3 1		9		
	· •	-				٠				
		7	otal Waste C	haracteristi	s Score	<u> </u>	N/A	20		
3	Targets Population Within 4-Mile Radius Distance to Sens		21 24 2	2 15 18 7 30 2 3	-	1 2		30	5.3	
	Environment Land Use	IIIAG	• .	2 3		1		. 3		
			Total T	argets Scor	•		N/A	39		
4	Multiply 1 x	2 . 3					0	35, 100		
[3]	Divide line 4 b	y 35,100 ar	d multiply by	y 100		s. •	0			

FIGURE 9
AIR ROUTE WORK SHEET

Pr 23

	S	s ²
Groundwater Route Score (Sgw)	84.62	7160.54
Surface Water Route Score (\$3w)	13.54	183.33
Air Route Score (Sa)		
S _{gw} + S _{3w} + S _a		7343.88
$\sqrt{s_{gw}^2 + s_{sw}^2 + s_a^2}$		85.70
$\sqrt{s_{gw}^2 + s_{sw}^2 + s_a^2} / 1.73 - s_M -$		49.54

FIGURE 10 WORKSHEET FOR COMPUTING S_M

1) A 3/67

	Fire a	nd (losi	on	W	ork !	Sne	et		· .		
Rating Factor	(Circle Out) huer							Score	Max. Score	Rel. (Section)			
Containment	1		•			3				1	NA	3	7.1
Waste Characteristics													7.2
Direct Evidence	0			3						1		3	•
Ignitability	0	1	2	3						1		3	
Reactivity	0		2	3						1		3	},
Incompatibility	,0		2	3		_				1		3	•
Mazardous Waste Quantity		1	2	3	•	5	•	•	•	1		. 8	
	· · · · · ·											· 1	
	Total Was	te C	ha	rack	eri	stic	s .Sc	ore	·		N/A	20	
3 Targets				•									7.3
Distance to Nearest Population	Ö	1	2	3	4	5				, 1		5	
Distance to Nearest Building	0	1	2	3						1		3	
Distance to Sensitive Environment	• •	1	2	3						1		3	
Land Use	.0	1	2	3		_				1	•	3	
Population Within 2-Mite Radius	0	1	Z	3	4	5				1		5	
Buildings Within 2-Mile Radius	0	1	2	3	4	5				1		5	
5-14116 1 120104													•
•													
	:				•						:		
	סד"ָ	tal T	arg	ets	Sc	OFE)				N/A	24	
4 Multiply 1 x 2 x [3						· · · · · ·				p/A	1,440	
5 Divide line 4 by 1,440 and multiply by 100 Sre - D/A													

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

PA Last Jan

	Direct Contact Work Sheet								
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)				
Observed Incident	0 45	1	0	45	8.1				
If line 1 is 45, preceed to 11 line 1 is 0, proceed to		_							
2 Accessibility	0 123	•	0	3	8.2				
Containment '	0 15	1	NA	15	8.3				
Waste Characteristics Toxicity	0 1 2 3	5_	NA	15	8.4				
Targets Population Within a 1-Mile Radius Distance to a Critical Habitat	0 1 2 3 4 5	4		20 12	8.5				
	Total Targets Score		N/A	32					
6 If line 1 is 45, multiply If line 1 is 0, multiply	1 x 4 x 5 2 x 3 x 4 x 5		0	21,600					
Divide line 6 by 21,600 and multiply by 100 SDC - O									

FIGURE 12 DIRECT CONTACT WORK SHEET

er Legge

DOCUMENTATION RECORDS FOR HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

LOCATION: 1074 Highland Read Highland MI 48031

fort & Sentan

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

Drug gradient wells and and and shaved copper concentrations greater than 10 times the copper concentrations detected in the approximate well and Reference 1, ps. 5.6, and 9

WEIL HM3 HM4 HM6
conc. Ck (M3/2) 480 840 30

Rationale for actributing the contaminants to the facility:

Chromium, zinc, auch Aluminum were also detected in the ground with downgradient at levels elevated when compared to updradient. These levels however are not high enough to include them in the observed levels taken in April, 1984 show a continued release of copper from the Siti (Ref. 15)

Lab number 1378701 37871 137873

CONC. CL (MS/2) 1040 565 20

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

The area of the site in Oakland County is underlain by a Complex jumble of Clay, sand and gravel. Relative to it's Capocity to yould water, outwash is the most important glacial deposit in Cakland (cunty (Ref 16p 93). This material Commonly Contains lenses of well sorted sand and gravel that provide large quantities of water. (Ref 16p 93). Based on studies performed on the permeability saturated zone [vater table(s)] of the aquifer of concern:

(See page 21)

Depth from the ground surface to the lowest point of waste disposal/storage:

REAL NOT

Depth to Aquifer of Concern (cont)

of this aquifer system, it can be shown that these beds or lesses can have interchange of water and are therefore connected. Ref 16, Fig 69, 70,71?

Fig 51:00 the permeability of the glacial deposits in 50 foot intervals. In the area of the site the permeability at all intervals is medium to high. A representative sampling of well logs (Ref 6) shows everyone to be drawing from glacial deposits in the depth range studied in Ref 16 pages 91-106.

18 \$ 187

Net Precipitation

Hean annual or seasonal precipitation (list months for seasonal): \mathcal{W}/\mathcal{H}

Mean annual lake or seasonal evaporation (list months for seasonal): P/H

Net precipitation (subtract the above figures): $\ensuremath{\mathcal{N}/\!A}$

Permeability of Unsaturated Zone

Soil type in unsaturated zone: N/A

Permeability associated with soil type:

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

N/A

St. 1 1/6/1

3 CONTAINMENT

Containment

Method(g) of waste or leachate containment evaluated: D/A

Method with highest score: N/A

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated: Copper, Chromium, and Alaminum. Ref. 1 pgs. 5.6, and 9 Reference Reference mu tris persistence Toxicity Fox 2, A; 866 Fee 3, 47 FR 31229 3 18 Copper Refs, Pg 701 Ref 3, 47 FR 31224 3 18 curpaism 3

Compound with highest score:

Capper and chromium both sear highest.

Score = 18

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

34,400 gallons of contaminated studge were removed from the boson (Ref. 4). An ananylis of the studge showed that it contained chromium, copper Nickel and zinc (Ref 5).

Basis of estimating and/or computing vaste quantity:

34,400gals (Ref4) # 50gal

Score = 4 drum = 688 cirums.

PA 15/87

5 TARGETS

Ground Water Use "

Use(s) of aquiler(s) of concern within a 3-mile radius of the facility:

There are no municipal supply systems serving residences in the three mile radius. The residences and businesses use groundwater as their sole source of drinking water. Ref. 13 lists all the public water supplies in Oakland Co. None are located in the 3-mile radius. The pop. derives its drinking water sistance to Nearest Well from private wells all in the againer of concern. (Ref. Scare = 3.

· Montres, Lands San Serv

Location of nearest vell drawing from aquifer of concern or occupied building not served by a public vater supply:

There are two decils on-site used for drinking water and process water.

One was found to be contaminated with Cu (Ref. 7). The wells

are between 60 and 80 feet deep and thus draw from the equifer of concern-Ref. 4

Provide wello w/mi/at least one (Ron Thorin 2558 lineighted Distance to above well or building:

well is on-site. Ref 7.4

Score = 4

Population Served by Ground Water Wells Within a 3-Hile Radius

Identified vater-supply vell(s) drawing from aquifer(s) of concern vithin a 3-mile radius and populations served by each:

From the representative sample of well logs (Ref. 6) it appears that all wells are screened in the glacial deposits aquifer.

3580 houses were counteed on the Topographical Map (Ref. 8).

(3580 houses) (3.8 people to 13,604 people.*

Computation of land area irrigated by supply vell(s) drawing from aquifer(s) of concern vithin a 3-mile radius, and conversion to population (1.5 people per acre):

No farmland is irrigated in the 3 mile radius (Ref. 9).

Total population served by ground water within a 3-mile radius:

Total Ripulation served = 13,604

Score = 5

Matrix Score = 40

The population is probably higher since there are 2 trader parks were of the site within the 3 mile radius. These people were not countric.

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum): Scaliments in water bury lake were found to be antaminated with chromium, copper, Dickel, and lead (Ref. 10, page 7), but this water may not be used to document a surface water-release since no background sample was taken.

Rationale for attributing the contaminants to the facility: Score = O

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

skipe calculated from the difference in elevation at HMB and HMZ

given on page 8 of Reference 1

who skipe = \frac{145.9 - 106.6}{500} \times 100 \times 0.7890

Name/description of nearest downslope surface vater:

Reference %

The wetland on the ENE sides of the Hi Mill property would recieve all runoff from the site.

Average slope of terrain between facility and above-cited surface water body in percent:

As clower on Ref. 8, the facility and the adjacent march lie within the Same rofort conterminterral the slope of the intervening terrain cannot be determined and is therefore considered to be iess than 3%- Ref E. Ref! Is the facility located either totally or partially in surface water? No Ref. 8

10/13/07

From Landing Fem. Action

Is the facility completely surrounded by areas of higher elevation?

No. Reference 8.

Score = 0

1-Year 24-Hour Rainfall in Inches

2.15 inches Ref. 3 - 47FR 31233

Score = 2

Distance to Nearest Downslope Surface Water

The ensite lagoon containing the hazard waste is approximately 40 ft from the state Recreation area. See Ref | Fig | and Ref 8.

Physical State of Waste Liquid . Ref. 4,5 Score = 3

3 CONTAINMENT

Containment

Method(s) of vaste or leachate containment evaluated:

Leaking surface Impoundment. The lagoon on-site has been observed to be overflowing into the boljacent massh.

Ref. 11, page 1.

Method with highest score:

Leaking surface Imputendment.

Score = 3

9/E S. 3/87

no. s There is

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

Marsh sediments show high concentrations of Chromicum, Copper,

wisher and Lead.

Compound Toxicity Reference Persistence Reference Metrix Scure

Cr 3 1, 17 76 3

Cu 3 1, 18 306

This is a 1 18 306

Compound with highest score:

Copper, Chromium, and Lead all sacre higiest

sure = 14

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of D (Give a reasonable estimate even if quantity is above maximum):

688 drums

Basis of estimating and/or computing waste quantity:
See Groundwater Route, page 4 of this documentation record

Score = 4

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

The wetland area which would receive site runoff is part of the Highland State Recreation Area. Specifically, it is used for open hunting 12ef 17. sure: 2

1784

Is there tidal influence?

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water vetland, if I mile or less:

Since the hazardour substance was discharged directly

to the wetland, The distance from the hazardour substance

to the wetland is zero. Ref. 11, Ref. 8

Distance to critical habitat of an endangered species or national wildlife refuge, if I mile or less:
No critical habitat of endangered species or national wildlife refuge exist in Califord county.
Reference 14.

Score = 3 Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

There are no drinking water intakes in the surface water.

Ref 13

Ja 2

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

There are no irrigation intakes in the nearby surface water (Ref. 9).

Total population served: 2200

Name/description of nearest of above water bodies:

Distance to above-cited intakes, measured in stream miles. N/A Score = 0

Charles May Nos

AIR ROUTE

1 OBSERVED RELEASE

Concaminants detected:

No release has been documented

Score=0

Dare and location of detection of contaminants D/A

Methods used to detect the contominants:

Rationale for attributing the contaminants to the site: $\frac{1}{2}$

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

N/A

Most incompatible pair of compounds: N/A

St 28.3/67

Toxicity

Hose toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity: \mathcal{D}/\mathcal{A}

3 TARCETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

C to 4 mi O to 1 mi O to 1/2 mi O to 1/4 mi P/A

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less: N/A

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less: N/H

TREA

Distance to critical habitat of an endangered species, if I mile or less:

N/A

Land Use

Distance to commercial/industrial area, if 1 mile or less: ν/A

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

N/A

Distance to residential area, if 2 miles or less:

N/A

Distance to agricultural land in production within past 5 years, if 1 mile or less:

N/A

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

N/A

Is a historic or landzark site (National Register or Historic Places and National Natural Landzarks) within the view of the site?

N/A

FIRE AND EXPLOSION

No fire or explosion hazard has been declared at the site by a state or Federal Fire Marshal. Route will not be scored.

1 CONTAINMENT

Hazardous substances present: □/A

Type of containment, if applicable: 12/13

2 WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements: NA

Ignitability

Compound used: N/A

Reactivity

Most reactive compound:

Incompatibility

Most incompatible pair of compounds: N/A

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility: 12/A

Basis of estimating and/or computing waste quantity:

3 TARGETS

Distance to Nearest Population

1/A

Distance to Nearest Building

11/4

Distance to Sensitive Environment

Distance to verlands:

N/A

Distance to critical habitat:

N/A

Land Use

Distance to commercial/industrial area, if 1 mile or less: N/A

EA.

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

W/A

Distance to residential area, if 2 miles or less:

N/A

Distance to agricultural land in production within past 5 years, if I mile or less:

NA

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

N/A

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

N/A

Population Within 2-Mile Radius

N/A

Buildings Within 2-Mile Radius

N/A

97.E.R.

DIRECT CONTACT

1 OBSERVED INCIDENT

Date, location, and pertinent details of incident:
There are no decumented instances where injury, illness, or death
was occured to humans a animals

Score = 0

2 ACCESSIBILITY

Describe type of barrier(s):
The site is completely fenced and can only be reached by by walking through the manufacturing plant. Ref: 1 (fig 1); Ref: 4
Score = 0

The rest of this racte need not be evaluated because a alirect contact score of zero and an accessibility score of zero will automatically make the racte score zero

3 CONTAINMENT

Type of containment, if applicable: 12/A

4 WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

Compound with highest score: 12/4

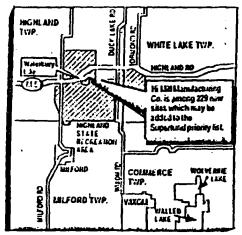
REALINET

5 TARGETS

Population within one-mile radius

Distance to critical habitat (of endangered species)

1 E 9-



The Oalland Press/MARK RADEMACHER

Highland plant on toxic list for Superfund

By B.A. MODRACK Of The Oakland Press

A manufacturing plant near the Highland Recreation Area — which in 1982 dredged a lagoon to remove toxic wastes — is among 229 new sites that may be added to the U.S. Environmental Protection Agency "Superfund" priority list.

An official of the Department of Natural Resources believes water flowing into the Highland Recreation Area may have been contuminated with

metals from the plant.

An estimated 14,000 people drink from wells that draw from the ground water within three miles of the site, a DNR official said. There is no known contamination of domestic wells in the area.

Hi-Mill Manufacturing Co. on Highland Road has been on the state list of toxic sites for several years, but has not been included previously on the federal list. If it is actually placed on the list, the site may become eligible for funding for study and cleanup.

Officials of the company were surprised by the EPA action, saying they felt they had complied with all environmental standards when they cleaned out the lagoon and altered their

discharge methods.

"It must be minute," said Robert Beard, a vice president of Hi-Mill, of the potential contamination. "I thought we were clean. We had it (the lagoon) scraped out, scooped out. We've done anything that they've asked for and nothing has gone into the ground since then."

Any hazardous m. ial that leaves the building is hauled away by a licensed carrier, Beard said. The cost of the cleanup was approximately \$50,000, he said. The plant employs approximately 45 people.

Gerry Nowak, an environmental quality analyst for the Michigan Department of Natural Resources, said the history of the site dates back to 1946.

Between that date and 1982, the plant had been fabricating aluminum, copper and brass on site and had been dipping and discharging wastes into an unlined lagoon, adjacent to Waterbury Lake.

"In addition, they sprayed rinse water in the air as a disposal method."

Nowak said.

In 1982, the DNR discovered copper while monitoring wells lower in grade than the site.

Also, Nowak said, contaminated metals were found in the mursh sediments and the water adjacent to the Highland Recreation Area.

"It's that the contaminants have flowed into the recreation area that bothers

me," Nowak said.

In 1982, the company was required to remove shudge and contaminated soils from the lagoon, transporting it to a hazardous waste facility.

"They went down to clean clay and used sand to fill the hole," Nowak said. Contaminated water was treated on site.

Current operations include recycling the riuse water, neutralizing the remaining water, and transporting it to a hazardous waste facility.

"The most important piece of information is that an estimated 14,000 people obtain drinking water from private wells within three miles of the site," Nowak sald.



APPENDIX C

MDNR HYDROGEOLOGICAL STUDY (REF. 2)

SITE NAME High-Mill Hann.
SITE ID MED DOS 341714

JAN 1

A Hydrogeological Study of the Vicinity of HiMill Manufacturing, Highland, Michigan

Water Quality Division Groundwater Unit Kathleen Sibo, Geologist August 31, 1982

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Appendix

Well Records

Summary

The HiMill Manufacturing Company, located on M-59 in Highland, Michigan, Oakland County, T3N R7E Section 23, makes fabricated tubing and fittings using copper or aluminum tubing (Legrand assessment July 29, 1980). The HiMill property borders on the Highland State Recreation Area. The HiMill lagoon is adjacent to a marsh connected to Waterbury Lake.

Wells were installed in the Highland Recreation Area outside the eastern and southern fence line of HiMill Manufacturing to determine if heavy metals were leaching from the HiMill lagoon into the adjacent marsh. Elevated levels of aluminum, copper, chromium and zinc were detected to the east and south-east of the lagoon. Somewhat less elevated levels of these metals were detected to the north-east of the lagoon, near the edge of the HiMill parking lot. Each of these wells was in or adjacent to the marsh and in the direction of groundwater flow from the HiMill property to the marsh.

Procedure

A preliminary site inspection was made on July 9, 1980 at the HiMill Manufacturing Company on M-59 in Highland, Michigan, which produces fabricated tubing and fittings (Legrand assessment, July 29, 1980). The inspection included some hand augering to determine the types of sediment on the site.

The wells were installed on May 18, 1981. The boreholes were hand-augered and the wells were installed to a maximum depth ranging from 3.84 to 6.9 feet. The wells were constructed of 1-1/4 inch I.D. schedule 80 PVC casing with 3 foot long size 7 slot PVC screens. The well annuli were packed to above the screen with #3 silica sand from the Gibralter Corporation. Bentonite pellets or powdered bentonite was used to complete the filling to the ground surface (see appendix).

The wells were sampled on May 19, 1981, using a hand-operated diaphram pump. The wells were pumped dry, rinsed with a small amount of Lansing city water and pumped dry again to help clear them. They were then allowed to re-fill before being sampled. Lansing city water was also pumped through the pump and hose to rinse them between the pumping of individual wells. Samples were taken for totals of chromium, copper, nickel, lead, zinc, and aluminum and were preserved and cooled according to MDNR Environmental Laboratory procedures. Water levels were measured by chalked tape on June 23, 1981 (see Table 1) and the site was mapped by the MDNR Engineering Division.

Geology and Ground Water Flow

The project site consists of relatively pure, dense clays and thin layers of sandy or gravelly clays. These generally are the result of water deposition and indicate a low permeability clay. This low permeability was observed during sampling by the slowness with which water entered the wells.

The top of the water table is at the ground surface in the vicinity of well HM3, approximately 35 feet east of the lagoon, at an elevation of 1006.0 feet. Ground water flow on the site is east, southeast, and south from the HiMill property into the adjacent marsh (see Table 1 and Figure 1).

Sampling Results

The location of well HM6 southwest of the lagoon was chosen for use as a background well since according to water table measurements it appeared to be out of the influence of drainage from the lagoon. Sampling results confirmed this since the metals concentrations of the water in HM6 were substantially lower than the highest metals concentrations and less than or equal to the lowest metals concentrations of water in the other wells (see Table 2).

The total chromium concentrations of the water in the wells varied from less than 50 ug/l to 160 ug/l (see Table 2 and Figure 2). The two wells with the highest chromium concentrations, HM3 with 160 ug/l and HM4 with 130 ug/l, lie to the east of the HiMill lagoon. The third highest, well HM1 east of the edge of the parking lot, had a chromium concentration of 110 ug/l.

The aluminum concentrations of the well water samples ranged from 1800 ug/l to 7900 ug/l (see Table 2 and Figure 3). Well HM5 southeast of the lagoon had the highest aluminum concentration; 7900 ug/l. The two wells with the next highest aluminum concentrations were HM1, east of the edge of the parking lot, with a concentration of 4600 ug/l, and HM3, east of the lagoon, with a concentration of 4000 ug/l.

The copper concentrations of the water in the wells varied from 30 ug/1 to 840 ug/1 (see Table 2 and Figure 4). The well with the highest copper concentration, 840 ug/1, was HM4 southeast of the lagoon. The two next highest copper concentrations were 480 ug/1 in HM3 east of the lagoon, and 230 ug/1 in HM1 east of the edge of the parking lot.

The zinc concentration of the well water samples ranged from less than 50 ug/l to 240 ug/l (see Table 2 and Figure 5). Well HM3 east of the lagoon with 240 ug/l was the well with the highest zinc concentration. The next highest zinc concentration was 110 ug/l in HM1 east of the edge of the parking lot.

Conclusions.

The aluminum concentration was approximately 4.4 times higher in well HM5 and approximately 2.6 times higher in well HM1 than in background well HM6. The zinc concentration was approximately 4.8 times higher in well HM3 and at least 2.2 times higher in well HM1 than in background well HM6. The total chrome concentration was 3.2 times higher in well HM3, less than 2.6 times higher in HM4, and more than 2.2 times higher in HM1 than in well HM6. The copper concentration was 28 times higher in HM4, 16 times higher in HM3, and approximately 7.7 times higher in HM1 than in the background well HM6.

This information combined with measurements of the top of the water table (see Figure 1) indicate that copper, aluminum, chromium, and zinc are leaving the HiMill plant site in the ground water and are flowing into the adjacent Highland Recreation area. Most of the metals are migrating east and east-southeast from the lagoon area and were detected by wells HM3 and HM4. Some of the metals are migrating from the northeast end of the plant site and were detected by well HM1 near the edge of the parking lot. Aluminum and small amounts of chromium, copper, and zinc are migrating southeast from the lagoon area and were detected by well HM5.

Project Personnel

Geologist: Kathleen Sibo Driller: Charles Ingalls Assistant: Jerry Parish

Driller's Assistant: Jerry Parish
—— Supervisor: Elmore Eltzroth

Surveyor: Gary Bilow, MDNR Engineering Division

Analysis: MDNR Environmental Laboratory

Drafting: Gary Taylor, MDNR Engineering Division

Table 1 Well Elevations and Water Elevations in Feet; HiMill Inc. Vicinity
June 23, 1981

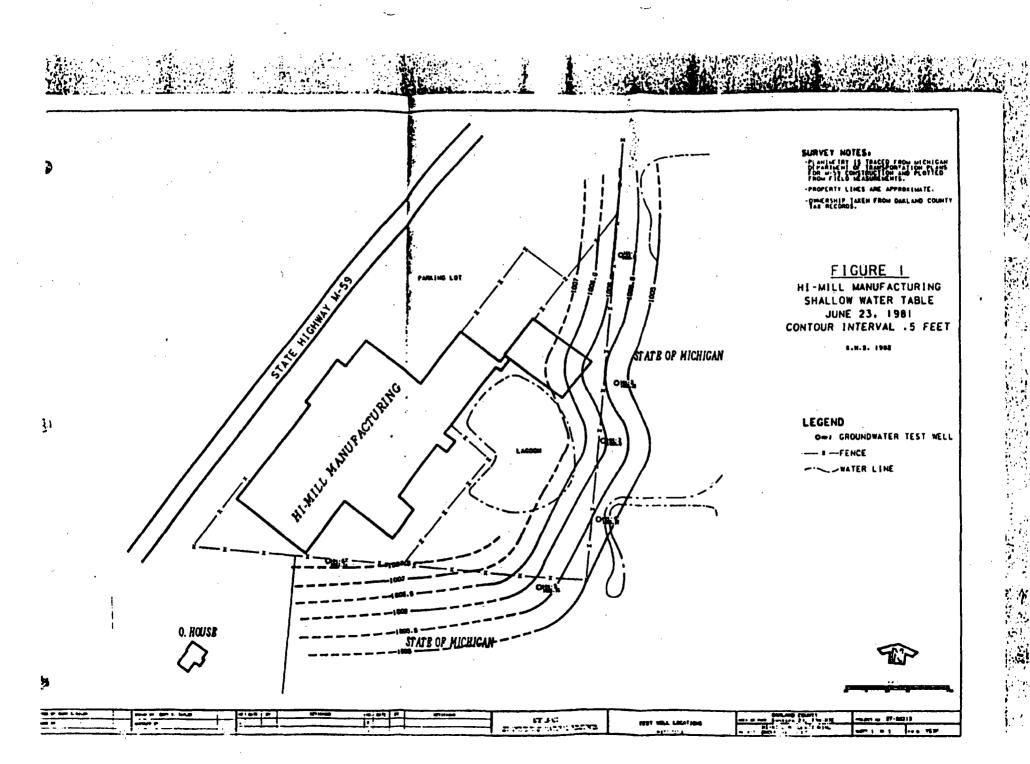
Well	Elevation Top of Casing	Elevation Ground	Height of Casing	Depth to Water	Elevation Water
HMI	1007.53	1006.5	1.03	1.62	1005.91
HM2	1007.07	1006.0	1.07	1.75	1005.32
нмз	1010.16	1006.0	4.16	4.7	1006.0
HM4	1009.58	1006.2	3.38	4.21	1005.37
нм5	1010.40	1006.4	4.0	4.64	1005.76
нм6	1011.09	1009.9	1.19	3.35	1007.74

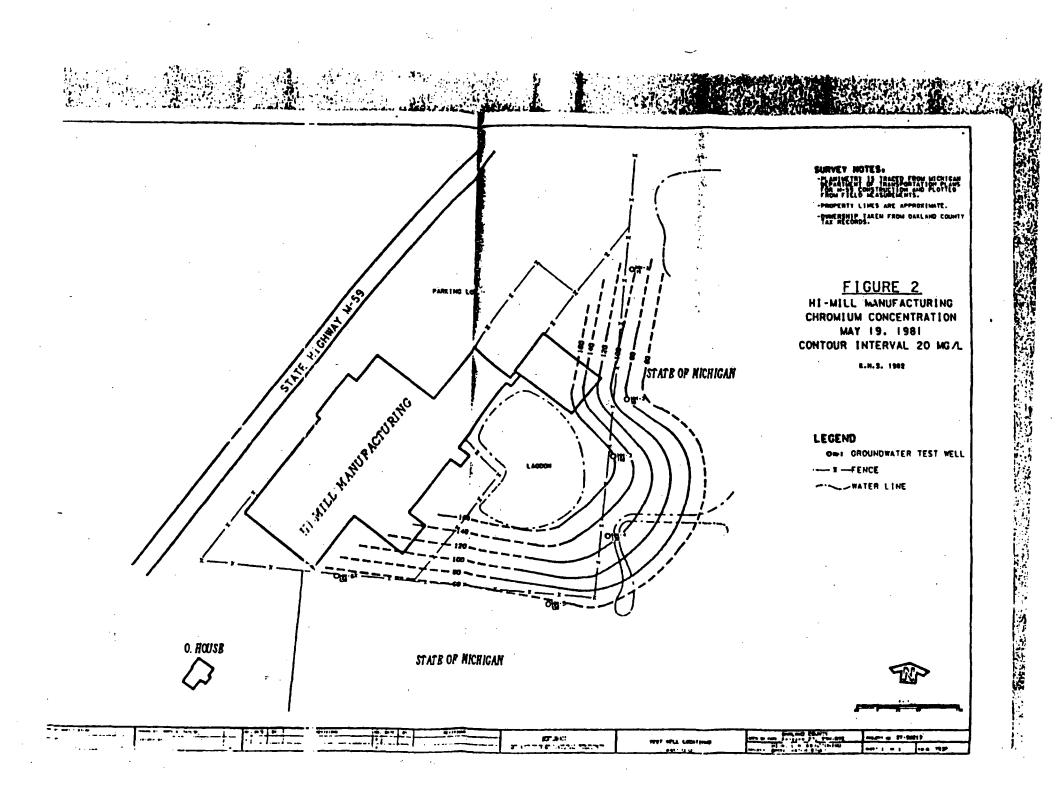
Elevations are based on MDOT Bench Mark 156A.

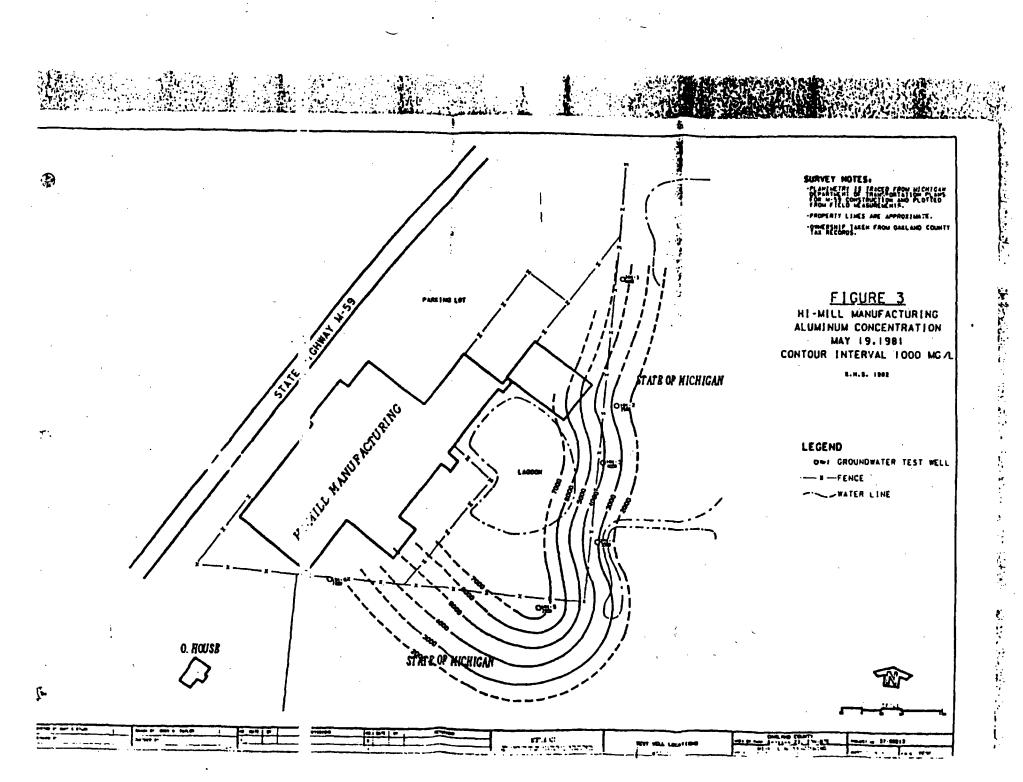
Table 2 Metals Content of Water Samples, HiMill Vicinity - May 19, 1981

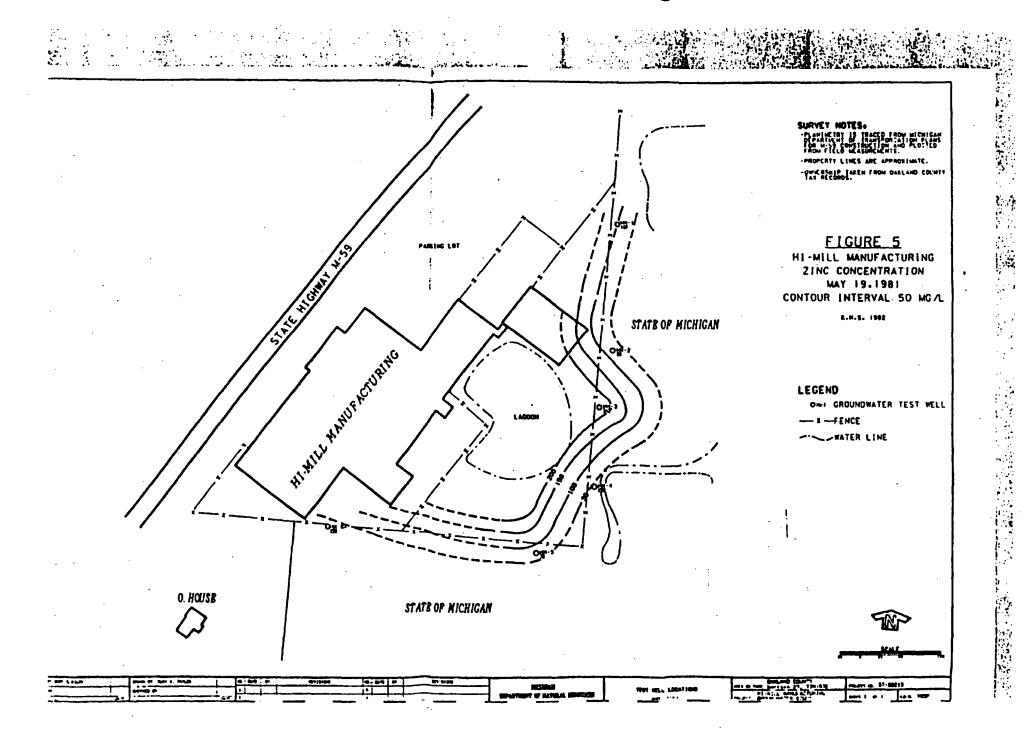
Well HMl	Depth (feet) 6.9	Total Cadmium (ug/l) K 20	Total Chromium (ug/l) ll0	Total Copper (ug/1) 230	Total Nickel (ug/l) K 50	Total Lead (ug/1) K 50	Total Zinc (ug/1) 110	Total Aluminum (ug/l) 4600
нм2	6.9	K 20	80	30	K 50	K 50	60	2500
нм3	3.84	K 20	160	480	K 50	K 50	240	4000
H M4	4.62	κ 20	130	840	K 50	K 50	K 50	3000
HM5	4	K 20	K 50	90	к 50	K 50	70	7900
нм6	6.81	K 20	K 50	30	k 50	K 50	K 50	1800

Note: Depth is measured from ground level to the bottom of a three foot screen. $K = Actual \ value \ is less than \ value \ given.$









Appendix

TEST WELL RECEND

1 14 1/0.			7)	PIKT T NO.
HM 1	PROJECT: Hi-Mill	Vicinity		791-812-463
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SEPTH PROME		SAMPLE	SET BETWEEN 3-9 P	T. AND 6.7 PT.
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w/ limen	ute staining.	1	SURFACE ELEVATION	··· C
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TEST WELL RECORD

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TEST WELL RECORD

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		[ent Jorry Parrich
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TEST WELL RECEND

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TEST WELL RECORD

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APPENDIX D
REPRESENTATIVE LOCAL WELL LOGS

WATER WELL RECORD

MICHIGAN DEPARTMENT

1 LOCATION OF WELL						PUBLIC HEA		
Oakland	Highland.		AE . A	3 OWLER OF	Section Number	Town Number	Aange Numb	ber ∕ y/ .
Distance And Direction from Roa	d Intersections		SE	3 OWNER OF	WEL	i	:	
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				Fittings:	-			
Genvel		6	79	9 STATIC WAT	PR + F+4F+			
C1		96	475	1	_			
Clay		70	175	10 PUMPING	ft. below land so LEVEL below land	surface		
Gamel		20	195	1		pumping	g.p.m.	
				1				
Clay & Gravel		45	230		ft, after hrs.	pumping	p.p.m.	
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USE A 2ND SHEET	IV NECEDE TO	4.		<u> </u>		•		
16 Remarks, elevation, source	e of data.		17 WATER	WELL CONTRA	CTOR'S CERTIF	ICATION:		
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W/ IR WELL AND PUMP RECOF

PERMIT NUMBER

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	•						
				Diameter (Steel Threads	Height: Abov	
ham t with a most		THICKNESS	DEPTH TO	4 4	Plastic Welded	Surface	<u>-</u> n
2 FORMATION DESC	RIPTION	01	BOTTOM OF		ft. depth	Weight 11	lbs /ft.
		STRATUM	STRATUM	Grouted Drell	Hole Diameter	Drive Shoe	□ \$ y _{es}
g	man /Bras	20			ft. depth	I Outs Suce	U Ves
Sand & Coarse Gr	SAST (KEQ)	25	25	8 SCREEN	fi depth		
C) C				1	l = 3	Not in:	stalled
Clay, Sand & Coa	rse Graver		ļ		inless c		
(5-4)		3.0	1.0	Sion of the	<u>. 10 </u>	ength4	
(Red)		15	40		119_#		
S 1 S 2 /7				·	🔯 K-Packer 🧧 🔲 🛚	_	remer Check
Sand & Gravel (F	(eq) (Aquifer)	15	55		ove screen to	Other	
				9 STATIC WATE			_
Sand & Gravel (G	ray)(Aquifer	15	70		ft below lend :		Row
	•	١ _			VEL: below land sur		}
Silt & Clay (Gma	<u>ry)</u>	3	73		it alter <u>l</u> his p		
		l _	00	l ——-	t. alter hrs. p	umping at	, G.P.M.
Sand (Gray) (Agu	ilfer)(Muddy)	7_	80				
1 . 				11 WELL HEAD COMPLETION	A Pulless and		bove grade
Fine Sand (Gray)	(aquifer)	10	90	12 WELL CRO	Basement		
7 134 2 73 75	.		3.00	12 WELL GROU	'EU' [3] No [Yes From	_ 10 11
Silt & Clay (Gra	LY)	12	102	Neat cer	nent 🔲 Benton	ite 🗌 Other 🔔	1
					🗀 penion	··· Li Oiner L	
Fine Sand (Gray)	(Aguifer)	4	106			dditives	
			ر د د ا		ce of possible contar		
Silt & Clay		10_	116	Type Sew	<u>er</u> Distanc	• 75 h Direc	tion N
m				Well disinfers	ed upon completion)	⊠ ves □	No
Fine Sand (Gray)	(Aqulier)	2	118	1000000			
Dine Cond & Co				1 12 - 0 - 0	Not installed	Pump Insti	Illation Only
Fine Sand & Coar	se Grayel			Manufacture	's name		
A - NE PER DE-	ived	_	100	Model numbe	r	_ HP Vo	lts
(Adulier). Part. ()	Pict tie 11 work 1901		123	1	op Pipe	_ ft. capaçity	G.P.M.
FEB.25		16)			Submersible	خسين في اعد □	
1-263	1 7/5/			PRESSURE T		J "	1
Eurena er eus		1.	! .\	Manufacture			
Occupied A Jun Sweet in	METOTO	l		Model numbe		Capacity	Gahons
15 Remarks, elevation, source of	dala elovos				ACTOR'S CERTIFIC or my jurisdiction and		
Driller: Frank	M. Benton		- 10 the b	est of my knowled	ige and belief.	····s report is 1/ue	
	16- 6		Val Bah	Talone	Wall Deil	ing Ka A	633
•	/. 'k' 'j	\c /	1/ UCC	REGISTERED BUSIN	Well Dril	REGISTRATIO	* NO.
	\.	4 //			avisbure		
	`\ `~			$\mathcal{O} \mathcal{I}$	A 6	1)	-24-8-
D67d (Rev. 10-80)			Signed .	AUTHORIZ	ED SEPRESENTATIVE	Date 10	- CY 1 -
		- 1 ₄ ,	,		//	•	

MAR 2 8 1975 WATER WELL RECORD MICHIGAN DEPARTMENT OF PUBLIC HEALTH LOCATION OF WELL lighland Section Number Town Number Range Numbe County Oakland 7 e/w. Distance And Diserting for the second and an arrangements 3 OWNER OF WELL: Address 2 Street address & City of Well Location 4 WELL DEPTH: (completed) Date of Completion 162 5 Acable tool Rolary □ 0 wg Hollow rod Jetted Bored 6 USE: Domestic Public Supply Irripation Air Conditioning Commercial Test Well 7 CASING: Threaded Welded R Height: Above/Bologo 4 in. 10 15811. Depth THICKNESS DEPTH TO Weight 10.40s/h. BOTTOM OF STRATUM **FORMATION** STRATUM __ in. to ___ ft. Depth | Drive Shoe? Yes No | 8 SCREEN: Stood pipe in sand - drove 21 21 Type: Slotted _ Dia.: _ Water bearing gravel 22 47 Set between 158 ft. and 162 ft. Fittings: Fine sand some gray clay 112 155 9 STATIC WATER LEVEL 23_IL. below land surface
10 PUMPING LEVEL below land surface Water bearing graves 162 ____ ft. after___ hrs. pumping ___ _ ft. after___ hrs. pumping ___ 11 WATER QUALITY in Parts Per Million: Iron (Fe) _____ Chlorides (CI) ___ Hardness _____Other 12 WELL HEAD COMPLETION: In Approved Pit Pitless Adapter 12" Above Grade 13 Well Grouted? 🔀 Yes 🗌 No Neat Coment Bentonite Depth: From _____ft. to 14 Nowrest Source of possible contamination 75 leat W Direction Sentic tank Type Well disinfected upon completion | Yes | No 15 PUMP: Not installed Flirt & Falling Manufacturer's Name _ ___ HP<u>?/4</u>Volts <u>__225</u> Type: Submersible Jet Reciprocating 16 Remarks, elevation, source of data, etc. 17 WATER WELL CONTRACTOR'S CERTIFICATION: OF DITTO DY CANTER, HER MG. This well was drifted under my jurisdiction and this report is true to the best of my knowledge and belief. Fettin Fell Dailling. L.Y Address 1051 Dung Laire Load

D674

2 13 h 167	WATER N		//
1 LOCATION OF WELL County Township Name		15Malund	
Oakland Highland			SW CE 2 3 N.S. 7 EVE
Distance And Direction from Road Intersections		- - - 	3 OWNER OF WELL:
REFERENCE	6.	,	Address
REFERENCE	- Mill V	Land	Tourse (
Street address & City of Well LocationSITE NAME HI-		100101	4 WELL DEPTH: (completed) Date of Completion
			155 11. <u>Yay 3, 1974</u> 5 📆 Cable tool 📗 Rotary 📗 Driven 🔲 Due
			Hollow rod Jetted Bored
~			6 USE: Domestic Public Supply Industry
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			☐ Irrigation ☐ Air Conditioning ☐ Commercial
			7 CASING: Threaded Weided To Height: Above/Below
1 MILE			Diam. Surface 1 n.
2 FORMATION	THICKNESS	DEPTH TO	4 in, to 151 ft. Depth Weight 10.895./ft.
- PORMATION	STRATUM	STRATUM	in. tofs. Death Drive Shoe? Yes 3060
	1		8 SCREEN:
	-	· · ·	Type: Stainless Dia: 3 5/8" Slot/Game 12 Length 4"
Brown dry sand & gravel	581	581	Set between 151 ft. and 155 ft.
Didni di dia di più di			Fittings: K-Packer-1' x 3" Nipple-3" Plug.
Brown gravel & clay	16'	74'	
_			9 STATIC WATER LEVEL
Gray sandy clay, some gravel	77°	151'	55tt. below land surface
Gray coarse water-bearing sand &	•		65 tt. after 1 hrs. pumping 12 g.p.m.
Gray Coarse water-bearing same a			
gravel	04*	155°	ft, afterhrs. pumpingg.p.m.
			11 WATER QUALITY in Parts Per Million;
	╂		Iron (Fe) Chlorides (CI)
·	}		HardnessOther
* -			12 WELL HEAD COMPLETION: In Approved Pit
	ļ		Pitless Adapter 12" Above Grace
	}	j '	13 Well Grouted? Tyes No
	ļ		Nost Coment Bentonite D
·			Depth: From ft. to ft. 14 Nearest Source of possible contamination
			50 feet Direction Septic Type
			Well disinfected upon completion pres Rc
HEALTH DEA			15 PUMP: Not installed
			Manufacturer's Name Sta-Rite Model Number 8P4C2 HP ½ Volts 230
SCHILL			Length of Drop Pipe 84 ft. capacity 8 G.P.M.
o Glib a Reco			Type: CSubmersible
2 2 2 2	ļ		
I MAIO			·
16 Renarks, Nevation, source of data, etc.	L	17 WATER	WELL CONTRACTOR'S CERTIFICATION:
		This well	was drilled under my jurisdiction and this report is true
POTED UTT OF PRINTED NO.	1		at of my knowledge and belief. PER 11. T.A. YMAN 0645 STERED BUSINESS NAME REGISTRATION NO.
\mathcal{A}		REGIS	TEREO BUSINESS NAME REGISTRATION NO.
PD'': "		, Address	10275 Fagle Rd., Davisburg, Eich.
CEPTH TO BOOK		_	1
1		Signed	AUTHOP TED AT PRESENTATIVE

O JUL 2 9 1975 L			اللاز اللا	<u> </u>		
		WELL REC				
1 LOCATION OF WELL	ACT 29	4 PA 196	5	OF PUBLIC MEALTH		
County Township Name	,	Fraction		own Number Range Number		
DISTANCE And Direction from Road Intersections		MIN. V	3 OWNER OF WELL:	3N9 1 7E		
• • • • • • • • • • • • • • • • • • •			Addiess	-		
Street address & City of Well Location				•		
Locate with 'X' in section below Sketch	Map:	7	4 WELL DEPTH: (completed) Date	e of Completion		
*			328 " S.	pT 1 74		
			Cable tool Rotary Hollow rod Jetted	Driven Dug		
			6 USE: Domestic Public			
				nditioning Commercial		
			7 CASING: Threaded Weided	Height: Above/Below		
7 1115			Diam.	Surfaceft.		
2 FORMATION	THICAMESS	BOTTOM OF	6_in. to 32511. Depth	Weight/997 lbs./11		
11	51RATUM	STRATUM	B SCREEN:	Drive Shoe' Yes No		
yellow SOAId+ Gravel	15	15		Dia.;		
vellow c/24	25	40	Sint/Gauza 5	ength 5		
course Gravel	3	43	Fittigos:	ade s'illug		
21	95	138	9 STATIC WATER LEVEL	JIE 3 1109		
Blue clay	73	75 0	10 PUMPING LEVEL below land surface			
courseGrave/+c/ay	95	233	45 ft. after 8 hrs. pun	noing <u>50</u> g.s.m.		
Bluc clay	80	313	It. after hrs. pur	noing g.p.m.		
HardooN days	10	323	11 WATER QUALITY in Parts Per Mi	•		
Hardpan c/ny+ Gravel			Iron (Fe) Chloride			
COURSE GravelasoNd	5	328	HardnessOther _			
mixed with Greve	,		12 WELL HEAD COMPLETION:			
1 +1 (13 Well Grouted? Yes No	12 2000 01300		
MIXED WILL GIEVE			Neat Cement Bentonite			
·	!		Depth: From tt. to 14 Nearest Source of possible cont	f1, amination		
			feetDirection			
,			Well disinfected upon completio			
			Manufacturer's Name	installed		
			Model Number	HPVolts		
			Length of Drop Pipeft. c	apacity G.P.M.		
			Type: Submersible	Reciprocating		
				•		
16 Remarks, elevation, poince of data, etc.	L	17 WATER Y	NELL CONTRACTOR'S CERTIFICA	ATION:		
ACUED INTO BY	N P 1	_				
CORRECTED BY	UNILLER, ITE	NB W	was drilled under my jurisdiction a st pl my knowledge and belief.	6406		
CORRECTED BY ACCITION BY ELEVATION DEPTH TO ROCK	ec.	Address	1307. Cass /ske	Keego Harbor		
DEPTH TO ROCK	1	A.	1307 G355/2/E	sept 111 20		

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,	
_	_
/ -	

		WELL REC		N	MCHIGAN DE	PARTMENT
1 LOCATION OF WELL !	ACT 25	94 PA 196	i5		OF PUBLIC H	EALTH
County Township Name		Fraction		Section Number	Town Number	
Oakland \ Highland	ł	SE, N	1Ensw	27	_ 3 N/6	. 7 EASTE
Distance And Direction from Road Intersections			3 OWNER OF			/
			. (
			Address	<u></u>	<u></u>	
Street address & City of Well Location				}		7
Locate with "X" in section below	Sketch Map:			i; (completed) C		
			118		ct. <u>1</u> 981	
	:		5 X Cable to			=
	/ }		6 USE: X Den		c Supply	
	133	1	Irrig	=	Conditioning	Industry
	1 5		7051	_	. One it rening	Commercial
Ž ,			7 CASING: TH	welded Welded	Meipht:	Above/ DNOW
1 will	·		Diam.	_		<u>1n.</u>
2 FORMATION	THICKNESS OF	DEPTH TO	Ain. to	114_ft. Depti	Waight][<u>,79</u> 16≥√t.
	STRATUM	STRATUM		ft. Depti	Drive She	007 Yes X No 🗌
Prove clay t cand	18'	18*	8 SCREEN:			
Brown clay & sand	10	18	Type: Sta	inless	. Dia.: <u>3 5/</u>	8"
Brown clay & gravel	211	391		20 114 ft. and		
			Set between Fittings:	ft. and		
Grey sand, clay & stones	06"	451		K-Packer -	Nipple -	Pluq
			9 STATIC WAT			
Blue clay & sand	221	67!		ft. below land sur		
D33 •	200	oct		EVEL below land t		
Blue clay & gravel	19'	85	<u> </u>	ft. after <u>3</u> hrs. p	umpine2[g.p.m.
Fine sand & gravel	281	114*		ft. after hrs. p	umning	4.00
The sand a graver		447		LITY in Parts Per		<u> </u>
Water-bearing gravel	04*	118'	iron (Fe)	Chlor	ides (CI)	
					-	
]				Other		
·				COMPLETION:		
<u></u>				iless Adapter [Grade
	انظر			ement 🔲 Sentoni		_
				m1. t		
				rce of possible co		· · · · · · · · · · · · · · · · · · ·
	110	\ \ \		<u>ll</u> Direction		
	(S)	Fol		cted upon complet	ion X Yes	No
	S S PAIN		15 PUMP:	_	ot installed	4
94	.0	Fi	Manufacture	14P4C02S	Sta-R нр_Ŀsvo	
0	"	人リ		rap Pipe <u>63</u> ft.		
		À	Type: 😿 S		Capacity 13_	U.F.M.
``.	2-1-17	/	=		Reciprocating)
•				_		
USE A 2ND SHEET IF HEEDED						
16 Remarks, elevation, source of data, etc.		· - ·		CTOR'S CERTIFIC		1 is true
WOLD INFO. BY DRILLER, LIEM ME		to the be	st of my knowle	dge and belief.		1
		RESIS	PERES SUSTAINES	-9XI3an	REGIST	"1645. .
CORRECTED ETC		Address	10275 Ea	ngle Rd D	avisburo.	liich.
	1	~00/425	·/,	ngle Rd., D		/
D.	R. L.	Signed	Culdi	- From	Date	114/51
D67d 100M (Rev. 12-68)			AUTHORIZED REP	RESENTATIVE		

16	WATER WE	LL RECO	RD MICHIGAN DEPARTMENT OF PUBLIC HEALTH 25
County Read Two. Hugh	land	Fraction Sedic Ser	14 SE X Section No. Town 3 Range 7 E.M.
Distance And Direction from Roof Intersection	OWNER No.		3 OWNER OF WELL
Street address & City of Well Location		رد - ب	Address
Z FORMATION	THICKNESS OF	DEPTH TO BOTTOM OF	4 WELL DEPTH: (completed) Date of Completion
	STRATUM	STRATUM	5 (Cable tool Rotory Driven Dug
		ļ	☐ Hallow rod ☐ Jetted ☐ Bored ☐ 6 USE: ☑ Damestic ☐ Public Supply ☐ Industry
Top Doil	21		Irrigation Air Conditioning Commercial
sandt grant	20	41	7 CASING: Threeded Welded Welded Height: Above/Below
	30	71	1 in: to Dopth surface ft.
clay i grand		41	in. to Drive Shoe? Tes Me
man pan	10	81	8 SCREEN: Type: De donne Dia.: 9
sand grand	29	110	Slot/Gouze 12 Longth 5 6
			Set between / Ciff ft. andft.
			Fittings:
			9 STATIC WATER LEVEL
			10 PUMPING LEVEL below land surface
		<u> </u>	70 ft. after 6 hrs. pumping 20 g.p.m.
		ļ	11 WATER QUALITY in Ports Per Million:
			Iron (Fe)Chlorides (CI)
			Hordness
			12 WELL HEAD COMPLETION: In Approved Pit Pitless Adopter IX 12" Above Grade
			13 GROUTING: Well Grouted? Yes No
			Meterial: Neet Cement
		<u></u>	Depth: Fromft. toft.
·			Necrest Source of possible contemination 360 feetDirectionType
			Well disinfected upon completion 🛱 Yes 🗌 Ne
			15 PUMP: Menufacturer's Name Hostore
			Model Number P679 HPK 220
			Length of Drop Pipe_30_th. capacity_45_G.P.M. Type: Submersible
6 Remarks, elevation, source of data, etc. € ∠ ≈ 9	25.Tago	17 WATER	WELL CONTRACTOR'S CERTIFICATION:
ADDED INFO. BY DRILLER, ITEM NO.		This we	Il was drilled under my jurisdiction and this report is true
•	•	122	Tenty Substitute Ording 0104-
• ORRECTED BY:		1	2/03/11/

**ADDITION BY

JUL 1 0 1980	<u></u> :	WATER V	WELL BEC	OPD L	یالیالہ الہ م		<u> </u>
1 LOCATION OF WELL		ACT 29				ICHIGAN DEPA OF PUBLIC HEA	
	Township Name	h LAN	Fraction		Section Number	Town Number	R.mge Numbur
OCKLANZ			SNE N	WAVE "	24	3 NS.	7 Ed.
Distance And Direction from Moad	nterMictions 		·	3 OWNER OF V	,		
				Address			- V. I
Street address & City of Well Locat				7			
				PRILL DEPTH	i: (completed) · D	ale of Completio	•
				5 Cable to		y Drive	m Dug
				Hollow	od Delle	d Bore	= 1
				6 USE: 🔼 Don	=	c Supply [Industry
			-	∐ Irrig	pation [] Air C	onditioning [Commercial
					ruaded We'ded	Height; Ab	ove/Below
		THICKNESS	DEPTH TO		90 ti, Depth	Surface	
2 FORMATION	٧	OF STRATUM	BOTTOM OF	in. 10	ft. Depth	1	29 lbs'lt. > Yes♥ No □
0				8 SCREEN:		Dilve since	- Vest No
Brown Sond	genel	20	20		NLESS		
	•	ا ، ی	40	Slot/Gauze	45	Jength _6_	<u> </u>
Boun Clay	Gravel	20	70	Set between	11ft. and	<u>1 </u>	
Brown San	7	10	50	K-	Darkor	-plua-	12'11.00
Blingl		30	90	9-STATIC WAT	ER LEVEL ft. below land sur		
DIDE CIAY	gea net		90	10 PUMPING L	EVEL below land s		
91045and	Line'	10	90	50	ft. afte hrs. p	umpine <u>50</u>	9.p.m.
)	C (7) - C -	7	97				
gray sang	COCISE				ft. after hrs. p ALITY in Parts Per i		g.p.m.
				Iron (Fe)	Chlori	des (CI)	
				Hardness _	COMPLETION:	T to Armond B	
	 .] 12" Above Gr	
	(63)				rd? Yes No		
<i></i>				8	ement Bentoni		
/>	γ. <u>&</u>				rce of possible co		
-15	988	· ·			Directio		Type
	<u> </u>	<u>_6;</u>	·	Well disinfe	cted upon complet	ion Yes A	
/113					N		
	14.	(2)		8	Der		•
- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	01/10110			ľ	rop Pipaft.	capacityG	.Р.М.
· · ·			9	Type: [] \$ 	Submersible	Reciprocating	
•				. ا			
use A 2ND SHEET IF			17 WATER	WELL CONTOA	CTOR'S CERTIFIC	ATION:	
o nemora, elevation, source (n Jule, Elli.		This well	l was drilled un	der my jurisdiction		is true
ADDED BY DRIEFR ITEM	•		to the be	LALCO	edge and belief,	<u>. 0</u> -	106
**ADDITION BY			REGIS	STERED BUSINES	HAME	REGISTA	ATION NO.
BLEVATION	,		Address	~27),(C	-10 25(1459)	keep n	snok
DEPTH TO PINCE			Signed	D. C. June	# X K	Date	Ì

D67d

W ER			JMP HECC P PERMIT NUMBER
1 LOCATION OF WELL AUG 12 1087	P##1 127	40" 368 PA	A ANGER
OAKLAND HIGHLAN	, / D	Fraction	1. 1/3 3 NB 1/ EAW
Distance And County from Egyp crestal top	I. U	 	2 <u>294344 4414</u>
			Address
	1		
Street Address F.C. v. on Went Cocases			Address Same As Web Loration? Yes No
Locate with 1 r Section Balov. Si	eich Map)	4 WELL DEPTH (completed Date of Completion)
			82 " 4/21/84
<mark>╽┡╼</mark> ╃╼╎╴╌╌┪			5 Cat e 1001 Fiction Diven Dug
			Mollow rod
[* ┡╶╶╡╴╴┾╶╶╬╴╴┪ ╸			6 USE Samestic Type Public Type III Public
			☐ 11 gation ☐ Tyze Hal Public ☐ Hear pump
			Test Well Type Ito Public
<u> </u>			7 CASING Steel Threaded Height Above/Below
M-1_E	1	DEPTH TO	Plastic Welded Surface It
2 FORMATION DESIGNATION	THICENESS	BOTTOM OF	Weight (pr. le
	STRATUM	STRATUM	Grounes D. more Dame e Drive Shoe
MUONE GOVERNO	46	46	i — "— " ""
MUDDY BROWN SAND	/ / 6	75	B CCECCY
CLAY	16	42	Type BURE WOUND americ 3
	1	<u> </u>	Siz: Galif J S Length Y
SAND + GRAVEL	2	64	Set between
			F.TT.N.SS X K Packer Lead Packer Bremer Check
CLAY	6	70	Bians above screen 18 11 Other
	_	_	9 STATIC WATER LEVEL
SAND + CLAY	5	75	11 below land surface Flow
51.12 531.5 681	7	82	10 PUMPING LEVEL below land surface
SAND SOME GRAVEL	•	^ ^	ti after 4 his pumping at 20 GPM
	1		fi after hrs pumping at G P M
			11 WELL HEAD COMMISSION Priess adapter 12" above grade
,	1		Basement offset Approved pit
			12 WELL GROUTED?
	i		1
1.2			Sean cement Di Berconia Dinher
	-		fed_of_tags_of_cement
	<u> </u>		·
	 		Time SEPTIC Towns 52h Source WEST
			Men disinfected upon completion? 🔀 sex 🗀 No
	RECEI	VED	14 PUVP Not installed Pump installation Only
Mich.	Dept. of 1	Public Hea	th Manufacturer's name RED JACKET
			Model number 75 NI CNINK 3/4 Votte 230
	JUN26	1984	Length of Droc Pipe
D.,,,,,,,	inf Emiss	nmastal -	nd cases as Auk
			IS Manufacturer's name X TROL
USE A 7ND SMEET II NEEDED	1.0.2.76		Model number WX 203 Capacity 12 Gallons
15 Remarks elevation source of data etc	1	16 WATE	R WELL CONTRACTOR'S CERTIFICATION
		This we	It was diffed under my jurisdiction and this report is true
ADDED INFO BY DRILLER, ITAM PL			rest of my knowledge and belief
CORRECTED BY		_ / 2	ERSONS - 0512
**ADDITION BY	, .	Address	100000 5/4411/60 4 40000

SERTICIONES COMO COMO

CEPTH IN W. W.

5₆v 10 60

D6∃n +

1 (OCATION OF WELL	<u> </u>						
0akland	Highland		SM.	SW NE	13	N/9 7	(E 1.)
Girleria And Clarinin River Briad in	18 - A-1 -			e Cantellate			
	-	-		Address		*	
Street Andress & Cruint Well Location	_			Aggiere Same Ar	Man I a	□ ves □ ·	
Locate with 1 Section Below		eich Map		4 VIELL DEFTH ICON			
				74	f ₁	9-8-84	
- - -		•		5 XX =1 15 1001	=:·•·.	D-wen 0	Jug
				☐ HC⊡OA FOD	t - 56.	Jened	
1-1-1-1-1				6 USE Examentic			lıç
				Test Well	=	_	
						Height Above Below	
				Plastic	C Trar-e sec	Surface fi	
		THICENESS	DEPTH TO	1 4 - 10 70	1	We 321 15 15	
ESPRENT ON DESC		STRATUM	STRATUM	n Grants In more 8	_ : -: -: -: -: -: -: -: -: -: -: -: -: -	_	
Proper olass &			48			Drive Shoe XX Yes	
Brown clay &	gravel	<u> </u>	40	B SCPEEN	_ tr_des	N _D	
Coarse gravel	- blue clay	15	63			Not installed	
00 00 00 00		 -/		Type John	180fi Dame	1. 0	
Med. sand, gra	vel - water	11	74	Serterater 70)		
				FIT NOS 52 NO	Packer _ sead	Packer Bremer Check	h
:				Biane above sci	reen t:		ple
				9 STATIC WATER LEVE			
<u> </u>		ļ		10 PUMPING LEVEL B	t below and surface		
				1		ing at60 G P M	
				1			
1				n aner		ing at G P M	
				11 WELL HEAD COMPLETION	Sex : es, scacier	12" above grade	
		-		12 WELL GROUTED?		es From 10	h
					<u></u>	Other	
				i			
			10	No of capt of ceme 13 Nearest source of p		-ov	<u>-</u> -
	1		F91 .	septi	C	50" Bresser 6W	,
	- YAG	200	F			_	
		:	[[]	Wends ferred upp		X Yes L Tes	
	C. Gu		. 7	l		Pump installation Only	
!			/	Manufacturer's nam			—— ļ
<u>.</u> :	- 1,011	1.		Model number Length of Drop Pipe		Cabatriy	
				! 		.e.	i i
		:		PRESSURE TATOR	_		
İ	RECEIVE	Þ		Manufacturer's nam			
USE A 240 SHEET IF		lic Realth	15 WATER	Model number			Gallons
15 Remarks elevation source of	MAY 1 6 19	35	This we	It was drived under my ju- est of multipowedge and	ersdiction and this	_	
	, ==	i North and	Fett:	ig's Well D		0413	
	Burese of Environm Occupational Helit	n GWCS	i	5575 Jack		REGISTRATION NO Davisburs	. — -
	(100 aparenar recin	-	Address	P 7			
Σ (1 € 30 € 30 € 30 € 30 € 30 € 30 € 30 € 3	. <u>.</u>	لـــِــــا	Signed	1 (401-3012ED REP	Mar Toka	_ 5-1-85	
60 00) ()		• •	
	•	and the second		. ,		· ·	

WATER WELL RECORD

	DEPARTMENT
C)F

1 LOCATION OF WELL						·		PUBLIC HEA	LTH
County	Township Name			Fraction		_		Town Number .	Range Number
DAKLAND	High	242			N MAE X			3 N ≤ 9.	7 EM.
Distance And Direction from Ros	d Intersections		١.	• •	3 OWNER OF	VELL:	\cdot . I_{i}	- March	11-11
i									
8									
Locate with "X" in section b	910 w	Sketch	M ap ; · ·	, M.	4 WELL DEPTH	_		ale of Completion	
					<u> </u>			7-11-7	8
					5 Cable to		☐ Note	=	n 🔲 Dup
					Hollow r		U Jerre		
					6 USE: Don		=	ic Supply	Industry
				:			⊢^	Conditioning	Commercial
					7 CASING: Th		1 777-19-1	Height: Abo	
					Diam.	resource of) meioei	Surface 12	
			THICKNESS	DEPTH TO	3_in. 10	753	t D	h Weight	
2 FORMATI	ON	- 1	OF STRATUM	STRATUM	in. to		ft. Dept		7 Yes 2 No []
			•		8 SCREEN:				
SAUD		- 1	42	イン	Trunch's	ملادد	Stil	Dia.: 3"	
					Stor/Gause	13	ZIE EI	17 D	
SAND & ClA	S	- 1	16	28	Set between	757	t =0d	79".	
l <u> </u>	•				Fittings:			Length 4 Ft	
GRAVEL & CI	NU	i	A_	60		-(Da	cK6	7	
			.1		9 STATIC WATE				
Clay			7	لديا	<u> 20</u>	ft. below	land su	face	
	Λ. Ι		_		10 PUMPING L		_		
SAUD CLAY'S	19UA9ELT		3	<u>[c]</u>	30	ft. after	<u> </u>	oumping <u>15</u>	G.D.M.
1010	•	- 1	,	72	1				
CIBU				73				pumping	g.p.m.
GRAUDI & S			1	79	11 WATER QUA			-	
PKHODI & Z				_/ 4	Iron (Fe)		Chlor	rides (CI)	
					Hardnéss _		Other		
	· · ·				12 WELL HEAD	COMPLE	TION:	In Approved Pi	•
		ł			_		7	12" Above Gra	
					13 Well Groute				
1		- 1	1		Nest C				
(1,011/6					Depth: Fro	m	ft.	10	
3	<u> </u>				14 Nearest Sou			- \	
1 /2 /	(/		İ		53 1001		_ Directi		
(E) O24,000	· - 				Well disinfe	cted woo			10
AUGI/ 10	LBJ	- 1	l				, , ,	ot installed	
					Manufacture			licy	335
Contral M	£9/							Non Z det	
1							_	. capacity 12 G	.P.M.
\'\\\ \'	₹6 /	- 1			Type: 💭 S		 10:	7 Basianas- :	
- रक्ताइर	·				ا ل	let	L	Reciprocating	
USE A 2ND SHEET	F WEEDED	ŀ			j				
16 Remarks, elevation, source				17 WATER	WELL CONTRA	CTOR'S	CERTIFI	CATION:	
Stateer.	TEM NO.			This well		der my ju dge and j		n and this report i	is true
- CAA	2			\$ <i>1,21</i>	No Well	17.7 <u>0</u>	line	15	06
1115				RESIS	STER BO BUSINESS	HAME		A REGISTRA	TION NO.
אל ווערינים אל				Address	102018	الحسيكا	<u>ullu</u>	101, 4840	4 2
ELEVATION DEPTH TO ROCK	. A ³² .			(\mathcal{D}	U_{-}	4:1		120
ILFIN IU NUCK				Signed	xewar	Sax	Ulst	(Date 7//	418
D67d 100M (Rev. 12-68)					#JI HORIZED REP	MESEN I A		, · · · ·	•

7 _ ADD 27	\	WELL DE	
APR 27 1981	WAIEK V	W ELL KE(4^^ \ 96	UKU MICHIGAN DEPARTMENT
		Fraction	
County Township Name		1	Section Number Town Number Range Number
Distance And Direction from Road intersections		WE % /I	3 OWNER OF WELL:
600 ft 5 of Teringalor.	T Lessen	7	
		. 0	Address
Street address & City of Well Location		• • • • • • • • • • • • • • • • • • •	is the state of th
Locate with "X" in section below Sketch	Map: /	1	4 WELL DEPTH: (completed) Date of Completion
	, ·		125 n. 12-17-80
			5 Cable tool Rotary Driven Oug
			6 USE: Domestic Dublic Supply Industry
			Test Well
			7 CASING: Threaded Welded Height: Above/Below
hamma MILE			Surfacett.
2 FORMATION	THICKNESS	BOTTOM OF	in. toft. Depth Weightibs./ft.
	STRATUM	STRATUM	in. toft. Depth Drive Shoe? Yes No
Land clay 15 France	30	30	Type Mark There V"
111111			Sid/Gause 12 Length 8 18
ideal France	50	80	Set between th, and 125 ft.
1./1/4. 1/0 11		98	Fittings:
Sard Fred 13. Clay	18	18	9 STATIC WATER LEVEL
161/ Benills water	10	108	60 ft. below land surface
1/1/1			30 PUMPING LEVEL below land surface
Stroll Grand W. Bearing	17	125	50 ft. after 1 hrs. pumping 43 g.p.m.
			50 ft. after hrs. pumping
·			tron (Fe) Chlorides (CI) _
			(ron (re) Chlorides (CI)
			HardnessOther
			12 WELL HEAD COMPLETION: In Approved Pit
			Pilless Adapter 2 12" Above Grade
			13 Well Grouted? Yes No
/- v'			Neat Coment Bertonite
			Depth: From tt. 10 tt. 14 Nearest Source of possible contemination
Z APR TOST E			EU feet NE Direction Styles Type
			Well disinfected upon completion ☑ Yes ☐ No
\&\.			15 PUMP: Not installed
			Menufacturer's Name 7 4 W . Model Number 15 C H - 10 HP 16 Volts - 3 0
51.71 LIV			Length of Drop Pipe 105 h. capacity 27 G.P.M.
			Type: Submersible
			Jet Reciprocating
			<u>-</u>
USE A 2ND SHEET IF NEEDED		17 W4 755 :	ACT I CONTRACTOR'S CERTIFICATION
16 Remarks, elevation, source of data etc. Altito INFO BY DRILLER, USAN NO.			WELL CONTRACTOR'S CERTIFICATION: I was drilled under my jurisdictiop; and this report is true
CHARLESTED BY			Story William 0311
YB NGITHIGA**		REGIS	STERED BUSINESS NAME, REGISTRATION NO.
ELEVATION CY L		Address	4794 11. Huck It pl. Hyple
Carto it acts		1	2 1 7 1
0474 100M /Bey 12.6B1		Signed	AUTHORISED SEPRESENTATIVE DATE 2-21-80

1 LOCATION OF WELL	ACT 29	4 PA 196	OF Public Health
County Township Stome		Fraction	Section Number Town Mumber Range Number
Dhamin's And Disprion from Road Intersections	· W	*	3 OWNER, OF WELLY
But Lesing to Get	10		
Word New 18 Come	Go.dl	S 10 -	Address
Street address & City of Well Cocation	Map:	1	4 WELL DEPTH: (completed) Port of Completion
	·		95 " Neb 76
│	•		5 (2) Cable tool Rotery Driven Dug
l*			6 USE: Decreatic Public Supply Industry
			☐ Irrigation ☐ Air Conditioning ☐ Commercial
			Test Well 7 CASING: Thresded Welded Height: Above/Seleve
1 M1LC			Diam. Surfaceft.
2 FORMATION	THICKNESS OF	DEPTH TO BOTTOM OF	4 in. to 921. Depth Weight // Ibs/ft.
	STRATUM	STRATUM	in. toft. Depth Drive Shoe? Yes 2010
Grand	48	48	Type: Tuesdies Dia .: 4
20	1'	52'	Stot/Gauss # Length 6
Clay 11 D	4,) = ,	Set between 91 ft. and G ft.
Whedler Grand	16	68	Tasky Clay of Corp.
Pour	7	75	STATIC WATER LEVEL
- Suy			ft, below land surface 10 PUMPING LEVEL below land surface
Jame Sull	_5_	80	
Wat S	15	asi	ft. after hrs. pumping g.p.m.
- Washi Such	16	70	11 WATER QUALITY in Parts Per Million;
ADDED INFO BY DRILLER TEM NO.			tran (Fe) Chlorides (CI)
*CORRECTED BY *** **ADDITION BY			HardnessOther
ELEVATION			12 WELL HEAD COMPLETION: In Approved Pit
BEPTH TO ROCK		 -	13 Well Grouted? Yes Annual Property 12" Above Grade
all'ille			Neat Cement Bemonite
(3)	· · ·		Depth: From ft. to ft.
10 Apr			To feet Direction Type
1PA - F8			Well disinfected upon completion Wes No
			15 PUMP: Not installed
			Manufacturer's Name
(6)			Length of Drop Pipe 75th. capacity
0,11=11			Type: Osomeraible Reciprocating
			. Class Cuerahocating
16 Remarks, elevation, source of data, etc.		17 MATED	WELL CONTRACTOR'S CERTIFICATION:
1 /		This well	I was drilled whiter my jurisdiction and this report is true
Willes Tog		10 the 00	In H Kdurde WW 15027
Willes Foy	k	// NEGI:	STERED BUSINESS RAME REGISTRATION NO.
C. Flurish IV		Address	1) - Julian Vill
		Signed _	ASTHORIZED REPRESENTATIVE Date Con 16
D67d 100M (Rev. 12-68)		. ,	

15	MATER WE	LL RECOI	ΚU	26-	MICHIGAN DI		
I LOCATION OF WELL	AC1 274	NE	**	米 春		r HEALTH 👟	26 = *
-1 T	•	Frection		Section No.	Town	Range	7
OATLAND HIGHLAN	VD	SEXU			3 N#	7 EA	7.
DISTANCE AND DIFFETION IFOR KOOD INTERSECTIONS	WHER No		S OWNER.	OF WELL			
The second secon			Address	- ••-			J
Street address & City of Well Location	-	٠,		•		i i i i i i i i i i i i i i i i i i i	1
2 FORMATION	THICKNESS OF	DEPTH TO	_	EPTH: (comple	red) Dete of C	emplotion	7
	STRATUM	STRATUM	- 3	<u>6.</u>	8-8-		4
RED SAND	70	20	5 00 Cab	ie tool iow rod		Privon Du Borod D.	•
RED SAND Gray WATER SAND	1	00			Public Supply	Industry	ᅱ
Gray WATER SAND	10	80			Air Conditioning		,
	•			Test Well			=
			Diom.	Threeded	Wolded Heigh	ht: Above/Below	
•		Ì	4 in. 1	. 26 in.		h. // /2 /b./h.	
			in, 1	• <u></u>	Depth Drive	Shoo? You No	
		 	8 SCREEN	<u>l:</u> ,		711]
				HN LESS		3	-
	 	 	· ·	···		61-6"	, ,
			Set betw	on 76 h.	PE 3" F	.	1
	}]	Fittings	7.0.	PE J"F	246	1
	 		9	PACK	Ercou	ŚĘING	4
	1	· .	STATIC	WATER LEVEL	nd surface (+10)	?Š)	
			TO PUMPIN	G LEVEL belev	r land surface		┪ .
<u></u>			_70	_11. of o 13	_hrs. pumping	<u>60</u>	.
	· ·			ft. efter	.hrs. pumping		.
			11 WATER	QUALITY in Pa	rts Per Million:		-
	<u> </u>				Chlorides (CI)		_[-
· .		.	Hordness		_		
	 				ION: In Appr	pred Pit	-
		,		Pitlezs Adapt			
			13 GROUTH	NG:	_		_
	ļ			uted? Yes Neat Come		-	1
				Fromft. to			7
	1		14 SANITAR			~ ~~~~~~	1
	<u> </u>	<u> </u>	-	Source of possil	ole contamination	77-	1.
			EQ_1		irection SEP		
	 	 	Well dist	RIVETOS UPOR CO	mpletion A Tes	<u> </u>	┥.
·	1			vrer's NemeZ	PIDAYT	ON	_
			Model Nu		<u>/</u> нг	1/2	-
					2.h. copecity_	G.P.M.	
elw: 3			Туре: 43.] Submersible] Jet	Reciproce	oting	-
16 Remarks, elevation, source of date, etc. 10: 20 20		17 WATER	VELL CONT	RACTOR'S CE			1
TOWNER WILL AND				under my juried vledge and balic	iction and this rep	port is true	
St.w.el.	10251	0541		IM ULEL	DHILL	A C3R	.
CORRECTED BY			CEISTERED BY	SINCSS HAME	<u></u>	EGISTRATION NO.	
WHITE HER KEITINGEN		Address	57 W.	BENE	thy si	<u></u>	
Appropriate and		Signed	ANCI	5 WLLD	tly 57 LUMBOIL 9	-8-67	
1		,		EPREBENTATIVE			
D67D 100M 6-66 110D 1000			Y CON	,			

	ACT 294	PA 1965	OF 14
LOCATION OF WELL		•	PUBLIC HEALTH Y
	hland	Fraction Swij5 a	JINE 1 14 Town Ronge 7 E.Y
Distance And Direction from Road Intersections	OWNER No.		3 OWNER OF WELL
		•	
		7/	Addiess
Street address & City of Well Location		<u> </u>)
2 FORMATION	THICKNESS OF STRATUM	MEPTH TO BOTTOM OF STRATUM	4 WELL DEPTH. (completed) Date of Completion 120 11. 5 29/67
			5 Coble tool Rotary Driven Dug
<u> </u>		 	6 USE: Domestic Public Supply Industry
Grosse sand b	coulders 0	50	Irrigation Air Conditioning Commercial
labbles I sand	20	70	7 CASING: Threaded Welded 7 [Height: Above/Below
			Lin. to ft. Death sauriese ft.
hard pan	15	85	Weight alastos/ft.
all hand pan	70	105	8 SCREEN
sinter fearing to	15	130	Type & Brass Die :: 3"
since seeing	al II	120	Slot/GauzeLength_9-6cock
			Set between 12 11. and 120 1t.
			Fittings: 3' perp.
,			9 STATIC WATER LEVEL (+ 7=5').
			10 PUMPING LEVEL below land surface
			_#0_ft. after Chrs. pumping 20 g.p.m.
			11 WATER QUALITY in Ports Per Million:
			Iron (Fe)Chlorides (CI)
·		[Hordness
			12 WELL HEAD COMPLETION: In Approved Pit Lyoure
			Pitless Adapter 12" Above Grade 13 GROUTING:
			Well Grouted? Tes 🔼 No
•	·		Meterial: Neer Cement
	·	 	Depth: Fromft. toft.
	ľ		Negrest Source of possible contamination
			foot Direction After Type
			Well disinfected upon completion 🖾 Yes 🗌 No
-			15 PUMP: 0 1 0
	· ·		Monufacturer's Name And Joseph
		,	Model Number <u>IPSCN</u> HP <u>-</u> Longth of Drop Pipe <u>CC</u> It. capacity <u>IS</u> G.P.M.
			Type: X Submersible
6 Remarks alousting account of data and		17 WATER	☐ Jet ☐ Reciproceting WELL.CONTRACTOR'S CERTIFICATION:
6 Remarks, elevation, source of data, etc. g	125" EPC >	This wel	I was drilled under my jurisdiction and this report is true
ADDED INFO. BY DRILLER, LIEM ME		to the be	ost of my knowledge and belief. No. In SMIP IL 0104
CORRECTED BY	6	<u> →ç</u>	REGISTERED BUSKESS HAME REGISTRATION NO.
	• • • • •	Address_	268 Highton I Rd
NOTIFICATION PA	,	.Signed_	DK - 5/26/67

AST 23,1967

D67D

1000

1 LOCATION OF WELL				PUBLIC HEALTH
County Qakland	Twp. Righland		Fraction	U. NW. 22 7 EAR
Distance And Direction from Ro	ad laterage trans	WNER No		3 OWNER OF WELL:
		WHEN NO.	لــــــا	Contractors General Co.
W				Address 23207 Lahser Road
Street address & City of Well Li	ocation	THICKHESS	DEPT- 10	Southfield, Michigan
2 FORMA	TION	DF STRATUM	BOTTOM OF	4 WELL DEPTH: (completed) Date of Completion 112 ft. 2-14-67
<u> </u>	 	1	<u> </u>	5 🛣 Cable tool 🔲 Rotory 📗 Driven 🔲 Dug
Yellow Dry Grave	el	20'	201	Hollow rod Jerred Bored
		401	(0)	6 USE Domestic Public Supply Industry
Sandy Hardpan		40'	60*	Irrigation Air Conditioning Commercial Test Well
Boulder		5'	65'	7 CASING: Threaded Welded Height: Above/Bolow
				6 in to 109 ft. Depth surface 2 ft.
Hardpan		30'	95'	
Sandy Hardpan	÷	12'	107'	8 SCREEN Johnson
Janey Marapan				Type Stainless steel Die. 6"
Pine Sand		51	112'	Slot/GZZZ 10 Length 5
		3'	115'	Set between 107 ft. and 112 ft.
Putty Sand		<u>-</u> -	113	1
Hole bollow	ed at 112		_	Fittings: 5" x 17" nipple
	•			9 STATIC WATER LEVEL
		 	-	10 PUMPING LEVEL below land surface
				105 ft. efter 8hrs. pumping 25
				•
	<u>-</u>			ft. ofterhrs. pumpingg.p.m. Il WATER QUALITY in Parts Per Million:
·				fron (Fe) 1.7 Chlorides (CI) 34.2
				Hordness 324.9
: 				<u> </u>
				12 WELL HEAD COMPLETION: In Approved Pit Pitless Adapter 12" Above Grade
,		 	 	13 GROUTING:
				13 GROUTING: Well Grouted? Tes And
	•			Material: Neat Coment Depth: Fromft.
			 	14 SANITARY: not known
		1		Nearest Source of possible contamination
				feetDirectionType
		 		Well disinfected upon completion Yes No-
	· • •	1 .	[Menufecturer's Name Jacuzzi Bros.
				Model Number 15S4CT2 HP 15
		 	ļ	Length of Drop Pipe95_ft. capacity23365.P.M.
			1	Type: Submersible
16 Remarks, elevation, source o	of data, etc.		17 WATER	WELL CONTRACTOR'S CERTIFICATION:
ADDED INFO. BY DRILLE			This well	II was drilled under my jurisdiction and this report is true
- West Di DRIETT	i HER NU.		L.	ost of my knowledge and belief. O. Corsaut Inc. 0025
CORRECTED BY:				REGISTERED BUSINESS NAME REGISTRATION NO.
SOUTH - C	4/2/12		Address.	15101 W. 11 Mile Road, Oak Park, Michi
**ADDITION BY, ATS			Signed	Over Cosant Dale March 23, 19
	HN2 30			AUTHOPIECE REPRESENTATIVE
D67D 100M 6-56	. =			

ACT 294

-	DEC 3 0 1975	WATER N	14 PA 196	55 OE
┵┎	1 LOCATION OF WELL		SW	NW 1/E Z3 PUBLIC HEALTH
	ander I Shalle	5		School Juneary Town Number Range Number 3 N. R. 7 E.M.
ľ	Distance And Direction from Road infersections	7-11.	بالراز المالي	Address
	Street address & City of Well Location)
ſ	Locate with "X" in section below Sketi	ch Map;		4 WELL DEPTH: (completed) Date of Completion
				ti. 5 Cablé toól Rozary Driven Dug Hollow rod Jetred Bored 6 USE: Domestic Public Supply Industry
İ				Irrigation
	FORMATION	THERMESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	Surfaceft;
	1.68 miles 55		.51	8 SCREEN:
	Charles 2 Lines &		10	Stat/Gauze / Length Set between ft. and ft.
	Sc. Dalleans		25	Fittings:
7			1	9 STATIC WATER LEVEL
-		 	 -	10 PUMPING LEVEL below land surface
		ļ		42tt. afterhrs. pumping
	·			ft. after hrs. pumping g.p.m.
				11 WATER QUALITY IN Parts Per Million:
-				(ron (Fe) Chlorides (CI)
-		<u> </u>		12 WELL HEAD COMPLETION: In Approved Pri
	6 19			Priless Adapter 2" Above Grade
T				1.3 Well Grouted? Yes No
-	/37	 		Nest Cement Bentonite
İ	/ F8			Depth: From ft. to ft. 14 Nearest Source of possible contamination
	= 360 13 1878 b			Seet Le DirectionType
_	() () () () () () () ()	1		We'll disinfected upon completion Tyres No 15 PUMP:
	(6)			Manufacturer's Name
-	132		-	Model Number
	CELLEY			Length of Drop Pips
	· · · · · · · · · · · · · · · · · · ·			Type: Submersible Jet Reciprocating
-	-	DB	This well	WELL CONTRACTOR'S CERTIFICATION: I was drilled under my jurisdiction and this report's 1/254
	POSSESSED OF THE LEEK TEM NO.		logine be	STERED BUSINESS NAME REGISTRATION NO.
	**ADDMIN ST		l	STEREU DUSINESS RAME REGISTRATION NO.
	ELEVATION		Address	
- 1	DEPTH TO ROOK		Signed	- X1 -1 Date 7 7 1

100M (Rev. 12-68)

D67d

		WATER \	WELL REC		i	MICHIGAN DEPA	RTMENT	
1 LOCATION OF WELL				·•		PUBLICHEA	LTH	
County	Trianspire Name	.Ci	Francisco	CC (C	Ser trup symen	Town Number	Range No	umber
(Cx. h	Ky hlan	1) -	17/2.0	SE SF.	121	N/S.		E/W/
Digrange Arm Deressiant	1	- Fl		3 OWNER-DE-	.a			7,1-
100		<u>\$</u>		Addres		······		
),				/	1-1-1			
Street address & City of Well Loc								7
Locate with "X" in section be	low					Date of Completion	(4)	•
				97		10-28	80	,
▎┡╼┩╼╬╾ ╌				5 Cable 1	001 🔲 A014	977 🔲 D1174	• [] Due
_				Hollow		ed Bored		<u> </u>
"	_			6 USE: Do		<i>r</i> –] Industry	
				_		Conditioning	Commer	Cial
					1 Well " C	merch -		
				/ CASING: Ti	weaded Welde	d 🔼 ¦ Height: Abo	va/Below	,
t wite		THICKNESS	222211 22		97	Surface	h.	•
2 FORMATIC	ON	OF	01 H1430 70 MG1108	1/ · · · · 1c	Z/11. Der:			
		STRATUM	STRATUM	10.10	ft. Dezi	n Drive Shoe	Yes A	•
	•	30	30	8 SCREPR:	/		•	
Millian Danie	/	120		TVDG	mson -	_ Dia.:		
Co O Desir	<i>V</i>	60	60	Slov Gauze	-62			>
Jany 6 24.		-	00	Set between	75 and _	// " /	ler h	_
Chain		15	85	Fittings: >L	Lebre B	may n. j	ال ال	
	 _		(1	9 STATIC WAT	ER LEVEL			
(6		12.	97.		ft, below land su	dece		
<u>J = </u>		, , , .			EVEL below land			
						purmoing 20		.
			<u> </u>					· .
					ft. after hrs.	pumpine	g.e.n	.
					ALITY in Parts Per			-
		i :		tran (Fe)	Chio	rides (CI)]
		† — — — — — — — — — — — — — — — — — — —		1 -				
	_ • •]		Hardness .	Othe	·		
T				12 WELL HEAD	COMPLETION:	n Approved Pi	1	
<u> </u>						12" Above Gra	de	}
				13 Well Grout	ed? 🗌 Yes 📗 No			
		<u> </u>		Neat C	ement 🔲 Benton			7
•		Ì		Depth: Fro				
<u> </u>		ļ — — i		4 .	urce P possible ci			1
	~			l .	<u> </u>			_ Type
		·			ected upon comete	tion Yes N	·	
9	769			15 PUMP:	م موکر	ioliyeijiioa	\mathcal{M}	l
·	-7-1	ļ		Manufactor	er's Name	10 3	770	, -
				ľ	2/00 mg 1 8		220	
. <u></u>						. capacital G.	P.M.	ļ
				Type: 🔯	Submersible	_		1
		 			Jer [Reciprocating		\
USC A 2ND SMEET II								1
16 Remarks, elevation, source		L	17 WATER 1	WELL CONTRA	CTOR'S CERTIFI	CATION:		
			This well	Was drilled un	ider my jurisquetic	n and this report i	s true	1
ו מזנני,	NEO BY DRILLER, UEM MI		10 the be	\$ 725%	edge and beyfel.	1/2	51	ļ
		.		STERED BUSINES	S MAME /	REGISTRA	110H NO.	
	Y EY	-	A	140 /	I do to	met to		
	4	• .	Addres	,	/		5.6	\leftarrow
12 14 23	COCK		Signed	10: 5	1 () 1 km	11 m	30-2	ا ر ر
			J. 10. 15.0 Z		- 77	UBLE		

		WATER V	VELL REC	ORD	MICHIGAN DEPARTMENT
1 LOCATION OF WELL		ACT 29	- PA 196	E SE	OF PUBLIC HEALTH
County	Townstyp Nime	./	Fraction	Sec. 1-02	Number Town Number Range Numbe
Allica-	1/cg/la	-	ر بخ		21 3 N'S. 7 E'
Orstancy-Arabbases and annual company				3 ONTHE OF WELL	
				Address	
á			~	,	-1
Street address & City of Well Lo	 :	ch Mack	10-11	4 WELL DEPTH, ICOM	pleted) Pare of Completion
			7	96	11. 5-23-80
				5 Cable 1001	Rotary Driven Du
				Hellow rod	Jetted Bored
┃ *ト¦ᢢ¦┤┺┰	•			6 USE: ∑⊇omestic	Public Supply Industry
				lrrigation	Air Conditioning Commercial
		•		Test Well	
I	•			/ CASING: Threaded Diam.	Welded Height: Above/Below
		THICPACES	2507- 10	4"	Surfaceft.
2 FORMAT	ION	0r	estray or	I	ft. Depth Weight / lbs./ft.
	01	31	3174100	B SCREEN:	ft. Depth Drive Shoe? Yes Y No
Jan / Trave	1/5 clay	36	36	Type: Safaral	مر بن Dia.:
				Slot Batize / 2	
and no	water	36	72		ft. and 96 ft.
la la la		7	80	Fittings:	ber Flug- Jest fele
Tid ledy			0	9 STATIC WATER LEVE	
14/1/2	1/11/12	16	96	50 11, belo	
Jany June	1/W sier	7 6	16	10 PUMPING LEVEL be	w land surface
					1 hrs. pumping 35 g.p.m.
		+	-		
· .				11. after	
				11 WATER QUALITY IN	
				Iron (Fe)	Chlorides (CI)
					
		 		12 WELL HEAD COMPL	ETION: In Approved Pri
-	~.~			Pitless At	
-				13 Well Grouted? T	es 🗌 No
	~\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			Nea: Cement	Bentonite
				Depth: From	
	-11	+		14 Nearest Source of p	Direction Alfilia Tvi
					on completion Yes No
\ -	~~!	 		15 PUMP:	Not installed
		i		Manufacturer's Nam	7.4 W:
133	-<3/			Model Number //	BE 9 HP / Volts 230
<i>-</i>					74 ft. capacity 19 G.P.M.
÷				Type 📝 Submers	ible
		 	,	☐ Jei	Reciprocating
USE A 2NO SHEET	15 MESDED	1			
16 Remarks, elevation, source		1	17 WATER	WELL CONTRACTOR'S	CERTIFICATION:
	ED EFFO BY DRILLER, ILLE			I was drilled under my i	jurisdiction and this report is true
ì	TO RIVE BY DRILLERS TERM) zu	STERE BUSINESS HAME	ill Tuling 031
	TOTAL CY	•	AEGI	STEREE BUSINESS HAME	BESTSTRATION NO.
1	1.1774	19	Address	4174 11.80	ux 1 15. Ipgflen
	" RUCY C	ン . ¦		Paul test	Date 5-27-8
	•		Signed	1 am ju	Date 3 2/2

D67d

1/5/	ACT 294	PA 1965		OF C HEALTH
1 LOCATION OF WELL		15		
Oakland Twp Highland			Section No Town	Range /Sec 7 E/Me
Distance And Direction from Road Intersections		1307115	3 OWNER OF WELL	<u>′5x 7 E^nx</u>
<u>O</u>	WNER No.	لصيب	Milford School D	istrict
· · · · · · · · · · · · · · · · · · ·	, 		Address Milford, Michigan	.
Street address & City of Well Location Northwest Ele				
2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM DF STRATUM	4 WELL DEPTH: (completed) Date of 90 is 7-14-	
	3188100	3182102		Driven Dug
Yellow Sand	10	10'		Borid .
			6 USE Domestic B Public Supply	
Gravel and Heavy Stone	15'	25'	Irrigation 🔲 Air Conditionis	g Commercial
7 7 7 7 7 7 7 7 7 7	201	/ -1	Test Well	
Yellow Sand & Clay Mixed	20'	451	7 CASING: Threoded 3 Welded Hei	ght: Above/SCECE
Fine Grey Sand	34'	79'		lec. 15" px
			in_tofi, Depth (Dir	1
Med. Fine Sand & Gravel	5'	84	8 SCREEN. Johnson XXXX	Stainless
		90'	Tyniop 5-1" #18 Die.:_	6"
Fine Water Sand	6'	*3	Mot tome 5 -1" #10 Length	111'=2"
			Set between 79 ft. and 90	
				1
		<u></u>	5" x 17" Nippl	.е
i			9 STATIC WATER LEVEL	
	-		32 ft. below land surface 10 PUMPING LEVEL below land surface	
			63 ft. after 4 hrs. pumping	167
				,
I	<u> </u>		ft, ofterhrs. pumping	
			11 WATER QUALITY in Ports Per Million:	
			Iran (Fe) 2.5 Chlorides (CI)	
			Herdness 290.7	
!			12 WELL HEAD COMPLETION: In App	proved Pit
			□ Pitless Adapter □ 12" A	bave Grade
		·	13 GROUTING: Well Grouted? Tyes The	7
	 		Moterial: Neat Cement	
			Depth: Fromft. toft.	
			14 SANITARY UNKNOWN	
<u> </u>			Nearest Source of possible contamination	_ 4
- /01 /02 5 - 13 mas	1	1	Well disinfected upon completion Ye	Type
e/ev 1025 = 55 mes St w el 993 = 55	 	 	15 PUMP:	<u> </u>
1 Stwel 993			Manufacturer's Name Jacuzzi	
			Model Number 1056 144 h Length of Drop Pipe 62 ft. capacity	1P
				<u> ₩₩</u> G.P.M. 170
I			Type: Submersible	cation
,16 Remarks, elevation, source of data, etc.		17 WATER	WELL CONTRACTOR'S CERTIFICATION:	
1		This wei	ll was drilled under my jurisdiction and this i	eport is true
			ost of my knowledge and belief.	- 0025
ADDED INFO. BY DRILLER, ITEM NO.		<u> </u>	O. Corsaut Inc.	0025
*TORREGIED BY:		A dd	15101 W. 11 Mile. Oak Par	k 48237
	•			Oct. 17, 196
255		Signed	DE LIZADOTE	<u> </u>

100M

WATER WELL RECORD ACT 294 PA 1965

MICHIGAN DEPARTMENT

LOCATION OF	WELL	· · · · · · · · · · · · · · · · · · ·		PUBLIC HEALTH
County	T-p. H16.	HCAND	SE Su	145W. 22 3015. Range 7 Ew.
Distance And Direc	tion from Road Intersections	OWNER No		3 OWNER OF WELL
) 				Address
Street address & Ci	ty of Well Location			
2	FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	4 WELL DEPTH: (completed) Date of Completion 38 ft. Beb. 9, 1968
Sand		10	10	5 Cable tool Rotary Driven Dug
Janu		10	10	6 USE: Domostic Public Supply Industry
Soft sand		20	30	☐ Irrigation ☐ Air Conditioning ☐ Commercial
Sand	w/b	8	38	7 CASING: Threaded Welded Height: Above/Below
				2 in to 35% Death lautines to
<u> </u>				Weight 3.75 Iba/ft.
				in. toft. Depth Drive Shoo? Yest No 8 SCREEN:
				Type wire wound Die.: 11 m
				Slot/Gouze 10 slot Longth 231
				Set between 352 ft. and 38
		-		·
			<u> </u>	Fiftings: standard
			<u>.</u>	9 STATIC WATER LEVEL
	-			10 PUMPING LEVEL below land surface
			<u> </u>	
		,		ft. afterhrs. pumpingg.p.m.
	<u> </u>			11 WATER QUALITY in Perts Per Million:
				Iron (Fe)Chlorides (CI)
				Hordness
				12 WELL HEAD COMPLETION: In Approved Pit
			<u> </u>	Pitless Adopter 12" Above Grade
	ı			Well Grouted? Yes No
				Material: Neat Coment
			-	14 SANITARY:
			ļ	Negrest Source of possible contamination
				75 feet Direction Pettic tank Well disinfected upon completion 2 Yes No
		-0		15 PUMP:
	Byo	thers -		Manufecturer's Nome_ not installed
	O			Model NumberHPG.P.M.
				Type: Submersible
	·		ļ <u>.</u>	☐ Jet ☐ Reciprocating
	ion, source of data, etc.			WELL CONTRACTOR'S CERTIFICATION: Il was drilled under my jurisdiction and this report is true
12 S.I.	≥		to the be	est of my knowledge and belief.
			Br	OWN Drilling Co. 26 REGISTERED BUSINESS NAME REGISTRATION NO.
i .			I .	7215 Highland Rd Howell, Mich.
		-	Signed	7-teins Billian Doro Dac 67
0678	6-66 APR 1 7 1966]	AUTHORIZED REFRESENTATIVE
D67D . 100M	e-ee MAK T (1200			· · · · · · · · · · · · · · · · · · ·

WATER WELL	RECORD
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MICHIGAN DEPARTMENT

1 LOCATION OF WELL		AC 1 25				PUBLIC HEA	LTH
County	Township Name		Fraction			Town Number	Range Number
Obselate ()	HIGHL1	TNID	' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	"NE"	22	- 3 N/S.	7 E/W.
Distance And Direction from Ro	24 1010100011000			3 DWNER OF	VELLIMAN -	· //	
					. '		y.**
1				Address	1.12 - 1 TI	- -	, ,
Street address & City of Well Lo							
Locate with "X" in section t	below Charles			4 WELL DEPTH	: (completed)	Date of Completio	n
				70 8	tı. ,	3- 0- A	
▍ ┝╶┽╶╎╸╌┤				5 🔲 Cable to	ol D Rota	Drive	n Dwg
	•			unilow !		ed Bore	•
 				6 USE	_	lic Supply	Industry
 				. =	=	Conditioning	Commercial
	•				well- Welde		
1 W/LE:				Diam.	Kesasa [] Weids	E .	,
		THICKNESS	DEPTH TO	2,0.10	5611. Dept	Surface	
2 FORMAT	ION	OF STRATUM	BOTTOM OF	7	ft. Dept	•	
	A A			8 SCREEN:		jointe since	7.23 [] 7.00 []
0-24: RVE	Braspek.0	29	245	1 TOM	W DAISSON .	_ Dia.: 15	,
				Stores	Je # 1 /	Length 37	,
291-400 (BFU)	SE KEKASANO	55	80	Set between	85 ti. and	3 % ".	
	•		a Co	Fittings:	0		
3KU 05K 5 B	M-DY + FINE SOI	10 10	890		Utach	12 4th	rk E
		1	,,	9 STATIC WATE			
30-5 X G	RAUFL	S	58		ft. below land su EVEL below land		
	•				ft. after hrs.		2
					rt. arter g nrs.	pumping	0.p.m.
	ļ				ft. after hrs.	numaina	p.p.m.
					ALITY IN PORTS Per		
				Iron (Fe)	Chio	rides (CI)	
				Hardness _	Othe	r	
·						In Approved P	
						12" Above Gr	ade
	A. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	أسوا		13 Well Groute	rd? Tes No	a long	Mein
				Depth: Fro	ement Bentor	D. Pop	2000 -11
		i : 1			rce of gossible c	onlamination	
				100 feet	$\mathcal{I}V$	~ n P Tr	TOL Type
		<u> </u>		Well disinfe	cted upon compte		10
				15 PUMP:		vot installed	
			•	Manufacture	. —		
				Model Numi		HP Volt	•
(19)				Length of D	rop Pipef	i. capacity G	.P.M.
					Submersible	_	
	3 × 3			∤ □⋅	Jes [Reciprocating	ļ
	- FD						Ì
16 Remarks, elevation, Som	e data etc.		17 WATER	WELL CONTRA	CTOR'S CERTIF	ICATION:	
17	15 - 9		This wel	I was drilled un	- · · ·	ngand this report	is true
157	AUDED INFO	BY DRILLER.	to the be	3422	The and belief.	1 OSC	4066
Chine	CCRRECTED	BY STILLER.	ITEM NEED	STERED BUDINES	ME - 1	REGISTA	ATION NO.
1.	MOITION	BY REL	Address	Boxxb	63/10	Aboli .	the second
1	ELEVATION	-		12211	, _	15	22725
	DEPTH TO ROC	:x	Signed	4/ L.L	RESENTATIVE	Date _/.5	ングダラ
D67d 100M (Rev. 12-68	1)		•	יוויייניייין ייטייעניייי		•	

002 20 10.0	WATER		
1 LOCATION OF WELL	ACT 25	94 PA 196	OF PUBLIC HEALTH
County Township Name		Fr + tion	Section Number Town Number Range Number
OAK HIGHLA	AL A	٠.	.NE. 22 3 NA. 20 E/W.
Distance And Direction from Road Intersections		— <u> </u>	3 OWNER OF WELL
-			Address
•			Address
Street address & City of Well Location Locate with "X" in section below Sheld	th Map: 1 >		4 WELL DEPTH: (completed) Date of Completion
Skeit	.II Mab.		50 0 175
			Cable tool Rotary Driven Dug Chollow rod Jetted Bored
* - -			6 USE Domestic Public Supply Industry
			☐ Irrigation ☐ Air Conditioning ☐ Commercial
]			Test Well
			7 CASING: Threaded Welded Height: Above/Balance
	THICKNESS	DEPTH TO	Surfaceft.
2 FORMATION	OF STRATUM	TO MOTTOS	
	31771000	SINATUM	Lin. 10 S. Depth Drive Shoe? Yes No
0-18 RED SAND	14	18	Type: JUHNSON Dia.: 15
_			Slot/General Length ?
15-30 SAND+CLAY	12	30	Slot/George Length 3 / Set between 55 ft, and 55 ft.
,	1 , =	110	fittings:
30-45 SAND (FINE)	15	45	9 STATIC WATER LEVEL
45-52 CLAY	7	52	tt, below land surface
7) 32	 /-		O PUMPING LEVEL below land surface
52-59 GRAVEL	6	957	22 ft. after_hrs. bumping g.p.m.
			Y!. •
<u></u>	 		ft, afterhrs. pumping g.p.m.
			11 WATER QUALITY in Parts Per Million:
	 	 	Iron (Fe) Chlorides (CI)
			HardnessOther
			12 WELL HEAD COMPLETION: In Approved Pit
			Pitless Adapter 12" Above Grade
	1		13 Well Grouled? Ves No
			Neat Cement Bentonite
	1		Depth: From tt. to tt. 14 Nearest Source of possible contamination
	 	,	60 feet A Direction SPFTIC Type
TOTAL STATE OF THE			Well-disinfected upon completion tes No
(V) CONTRACTOR			15 PUMP: Not installed
Y Paris - V			Manufacturer's Name
- Fg			Model Number HP Volts
2319/5			Length of Drop Pipeft. capacityG,P.M.
in Journal of the second			Type: Submersible
12			Jet Reciprocating
12.			•
16 Ramaks, elevation source of date. ATO BY DRILLE.		=	VELL CONTRACTOR'S CERTIFICATION:
CORRECTED BY	K. ITEM NO.		was drilled under my jurisdiction and this report is true stigl my spowledge and belief.
ADDITION RY		15	TERED DISINES NAME REGISTRATION NO.
ELEVATION		46913	B. 15 F.
DEPTH TO ROCK		Address	Mit 17 1 ingo 140 for
· · · · · · · · · · · · · · · · · · ·		5 Signed a	N. 12 Date 6 5 75
D67d 100M (Rev. 12:68)		• · · · · · · ·	AUTHORIZED REPRESENTATIVE

CTOLOGICAL CURINEY CAN

D67d

WATER WELL RECORD

MICHIGAN DEPARTMENT

ULLECATION OF WELL		AC 1 23	PA PA 191	00		PUBLIC HE	ALTH	
County	Township Name		Fraction.		Section Number		Aange N	umber
OAKLAND	HIG	HLAND	No.	14	21	3 N'S.	- P	E/38.
Distance And Direction from Ros	of Intersections			3 OWNER OF	WELL:		_ `	
	-					7		
•			•	Address		<u> </u>	7	
Street address & City of Well Lo	···				<u>{.</u>		K	
Locate with "X" in section b	pelow Sketc	h Map:				Date of Complete		
				44		June, 1974		
				5 Cable 1		tary Driv	-	Oug
~ - - - - - -				Hollow		tted Bore		J
				6 USE: Do	=		Industr	
├ •				. =	gation [] Ai t Well []	r Conditioning (Convine	rcial
						ed Height: Al	/ 0	
1 MILE				Diam.	meanement were	Surface _	1	•
		THICKNESS	DE # TH TO	2 10.10	41 " Day	pih Weight 3		
FORMAT	ION	OF STRATUM	STRATUM	•		oth Drive Sho	-	
		1		8 SCREEN: J	ohns on			
Sand, some clay and	i stones	35°	35*	Type: Rec	i He ad	Dia.: 14th	l	
				Slot/Gause	10	Length 30		
Water bearing sand		9*	111.	Sel belween	41 h. and	44 h.		
				l e		s, 1 Nipple		
				9 STATIC WAT				
200 TOT	11 - 2 , 1 , 5	 		1 00	ft. below land s	utece		
		 			EVEL below land			
135 11.27	Election of	,		_25_	ft. after hrs	. pumping10	9.0.	m,
				1				
Dulle					ft. after hrs	. pumping	g.p.	m,
•				11 WATER OU	ALITY in Parts Pe	r Million:		- -
 				Iron (Fe)	Chi	orides (CI)		
	<u>.</u>				COMPLETION:	In Approved F		
			ł	·		12" Above G		
		1			d' Yes N			
	·		<u> </u>		ement Bento			
				Depth: Fre		. to1ı.		
		 	L	4	rce of possible	_	•	_
)		1	}		Direc		ic No	Type
		 		15 PUMP:				
				Manufactur		Not installed		
	'			Model Num	66.10	HP Vol	, 230	
			<u></u>			n. capacity 10	5.P.M.	
				1	Submersible			
				<u>E</u>	jet	Reciprocating		
•		,			•			
16 Remarks, elevanori Proces		L	17 WATER	WELL CONTRA	CTOR'C CERT	ICATION:		
TO DEMOKS, CICTORON, 60000					CTOR'S CERTIF	·ICATION: ion and this report	is true	
PODPRECTED BY	por .		to the be	est of my knowle	edge and belief.	06		
**	. •			STERED BUSINESS			ATION NO.	
- ADDITION BY	4.566	**	Address	10275 Ē	agle Rd.	Davisburg		
				1			//	
		N.	Signed 2	James.	11 Juyan	Date 6/	20/7	2
0474 100M (Ben 12-68)			<i>[]</i>	AUTHORIZED RE	RESENTATIVE			-

	(9X)	WATER V	VELL REC	ORD	,	WICHIGAN DEPA	ARTMENT
1 LOCATION OF WELL		AC1 25	- FA 130	.5		OF PUBLIC HEA	LTH'
County	Township Name	1	Fraction		Section Number	Town Number	Range Number
OHK/HND	Highland		BE 45	W.SW.	21	3 N/K	7 8/4
Distance And Direction from Road 1	ntersections			3 DWNER OF	WELL: HIS 111	11 MFG	Ca
	-		Linn	Address	1704	17-59	
	ير الريخ		لہ	1			
Street address & City of Well Locat Locate with "X" in Section belo				4 445		HAND	
Cocase with a section serio	Sketch	мер:				Date of Completio	
				50	<i>J O</i> H.		13 67
				5 🔀 Cable 10		77 Drive	
*				6 USE: Don			
					pation Air		Industry Commercial
[=	Conditioning [A Commercial
				7 CASING: TH		d Height: Ab	ove/Below
1 wite				0 m. 6		Surface	
		THICKNESS	DEPTH TO	6 10. 10	4511. Dept	h ¡Weighi	
2 FORMATION	·	OF STRATUM	BOTTOM OF	II.		•	
0,01				8 SCREEN: Ja	phasm si	n Drive Shoe	tee/
Ked C/A4		10	10	Type: W	10	_ Dia.:	
01 - 01		01	7/	Sion/Cours	50 45 ft. and _	Length _5	
19/ve CIAY	<u> </u>	26	36	Set between	45 ft. and _	<u>50</u> k.	
Blue Clay GRAVEL		14	50	Fittings:	Stano	ARD	
			 =	9 STATIC WAT	ER LEVEL		
				9	tt. below land su	rface	
	· · · · · · · · · · · · · · · · · · ·			10 PUMPING L	EVEL below land	surface	
	· · · · · · · · · · · · · · · · · · ·			l ——	ft. after hrs.	pumping	g.p.m.
-				ļ			
					ft. after hrs.		g.b.m.
					ALITY in Parts Per		
				Iron (Fe) _	Chlo	rides (CI)	
				Hardness	Othe	•	ł
						In Approved P	it
			ı			12" Above Gr	1
				13 Well Groute	od? Ves No		
				☐ Neat C	ement 🔲 Benton	nte 🔲	
				Depth: Fro		101t.	
				4	uce of possible c	ontamination C	ptic Troe
				50 feet			
				15 PUMP:		tion Yes N	
					c's Name De	ot installed R	* +
				Manufacture		THE 2 VOIT	
·				D		. capacity G	
				1	Submersible		
	<u></u>			l A	_	Reciprocating	
]			
USE A 2ND SHEET IF			<u></u>	<u>L</u>			
16 Remarks, elevation, source of					CTOR'S CERTIFI		
i transition		n'	inis well	i was drilled un ist of my knogwie	edge and belief	on and this report	" "ve
100			DRO	wn Dr	Edge and belief EU 21// Lug EU 5 HAME	·/// -	ATION NO
The section of the se	3						
CAUDITION BAT	760					Howe li	
	£			Lane M.	Buren .	- 11.	6-70

SEP 04 1979		WATER N	WELL REC			MICHIGAN DEPA OF PUBLIC HEA	- ···
County	Lexiging Lagra		Franchisen		Sea Lice Number		Bunge Number
Carle-ci	History	1.	C . C		171		
	14/5/2/2	/	10000	0.32.	1 -2 /	<u> </u>	7 (E)v.
Distance And Direction from Head	ingital ental touse	/		3 CHANGE OF	WELL/		
				Address	11=05:=1=		
	<u></u>	,		100 E			
Shediraomes sharting-piraminingota	110"			[·			
Locate with "X" in section bet	Dw Shale	Mag:		4 WELL DEPT	H:=\Completeu-		
					f' n.	1/- 14-	コブ
				5 Cable I		pterv Drive	
				Hollow			
• - · - - - -				6 USE: X Do			
				_	=		Industry
					=	ir Conditioning	Commercial
					it Well		
				.7 CASING: †	hreaded 🔲 Wel	Ged Height: Ab	ove/Below
hammer with a manual				UI SML	_	Surface	fo.
2		THICKNESS		4 10, 10	الاستراحات	weight	lbs./ft.
Z FORMATIO	rs.	STRATUM	STRATUM	10. 10		Drive Shoe	
/		†	_ `	8 SCREEN:	1	7	
1 Clay & Bear	. <i>Y</i>	Í	50	1 - 4,00		. 41'	•
		 		Vo Car	15	Dia.;	
		1	60	SioliGayee	/	Length	<u> </u>
h		 	5 -	Set between	/c \$ - n. and		
Se S Mes	\mathcal{V}]	15.	Fittings:			
in !! ! ME	ميديد	ļ	00				
		i	ŀ	9 STATIC WAT			
		<u> </u>	<u> </u>	20	ft, below land	surface	
			ļ		LEVEL below lar		- ,
		_		20	ft, after hr	5. pumping <u>25</u>	Z 0.0.m.
			[ft, afterhr	s. pumping	g.p.m.
				11 WATER QU	ALITY IN Parts P	er Million:	
		1	1	Iron (Fe)	C+	itorides (CI)	
			 	_		- · · 	
	•	·	l	Hardness	01	her	
	/-			12 WELL HEAD		n Approved P	
1			ł	1 .		12" Above Gr	•
 		 	 				a0e
}	1		/:		ed? Tyes T		•
	• • • • • • • • • • • • • • • • • • • •	 	<u> </u>	1 —	Cement 🔲 Beni		<u>~</u>
	' - ''	22,91	Ĭ	Depth: Fr		1. 10f1.	
		1363 -			urce 01 00851016	1 . <i>f</i>	•
	لمها			1		crion Agrica	Type
		1		<u> </u>	ected upon com	ilelion Yes N	10
				15 PUMP:		NOT ANTHIED /	\checkmark
	•	>) Manufactus	ror's Name 12	ed year	
		S			4.1/1/c-	2 HP/2 VOIT	220
		ł	1) annih of	Dron Bine O C	It. Capacity 0	
		 	 	1 .	Submersible		
1			İ	VIII			
		 	 	,	Jet ·	Reciprocating	
		1]]			
USE A 240 SHEET IF		l	17 104 755	L CONTO	ACTOR'S OFFI	EICATION	
16 Remarks, elevation, source			117 WATER I		ACTOR'S CERT	FICATION: tion and this report	is true
CORNECTED HE SIMILIEN SIEM N			10 the be		cage and belief	The first tender	11-11
Comprise the 14 and			Chra	MMC	ms w	.D anc	115"
ADDOME IN THE			REGIS	STERED BUSINES	IS NAME	A GISTA	ATTON NO.
LIEVATION			Addres	140 m	delle	wale	
DEPTH TO ROCK	.6					. ,	10
	4		Supple	-1	10/1/	11-7 Days 41-	_14.77

1609 (Rev. 12-58)

WATER WELL RECORD

MICHIGAN DEPARTMENT

I LOCATION OF WELL	ACT 259 PA 190			PUBLIC HEALTH				
County	Couriship Name		Fraction		Section Number	Town Number	Range Number	
Oakland	High land	•	55 .5	E NE	14	3 Ne.	1 E/1.	
Distance And Direction from Road	Intersections.	_		3 Owner OF	ill O	CONST CO		
N. Company		·	Ī		١٤٥٥١١٨	CONST CO	•	
	-	-	*	Address 8	Allford			
Street address & City of Well Loc	alion			Ì				
Locata with "X" in section be		h Map:		4 WELL DEPTH	i: (completed)	Pate of Completion	· · · · · · · · · · · · · · · · · · ·	
				ŀ	2 2 11	2-20-71	,	
				5 Capie 10		'v Driver		
				Mollow !			<u> </u>	
ᆘᄴᅡᅩᆑᅩᅷᅩᆒᅩᄍᅼᄠ				6 USE. 200		C Supply		
				. =		Conditioning	=	
▌ ┝╼╺ ┥╸ ╾╈╺╌╬╸╾┥╘					_	Conditioning	Commercial	
						Height: Abo	a/Relaw	
				Diam.		Surface	_	
	· · · · · · · · · · · · · · · · · · ·	THICKNESS	-	. 2	2611. Dez:			
2 FORMATIC	ON	OF STRATUM	BCTTOW OF	· ·		Drive Shoe?		
		 		B SCREEN:	4. 5et:	Drive Snot?	143 0 140	
LNKNOWN			11		Tan Marie			
UTANDUN			- 			_ Dia.:/ / <u>/</u>		
SOND + Grave	. /	7	20			Length		
1226 F G-AVE	<u> </u>	 			28 ft. and _		,	
1/2 - 12	1600	2%	22 1/5	Fittings: 2	O- WIANK	Check v.)/ve	
yellow clay,	Gravel	2/2	12	9 STATIC WAT	FB I FVFI			
Gravel		3 1/2	26		ft. below land su			
Graves		3/2	~•	10 PUMPING L	EVEL below land	Surface	 	
1 T P	1-11	6	22	l .		pumping	7	
Water Bearing	32~6	 					9.0.m.	
				1	ft. after nrs.	0.150100	g.p.m.	
		 			ALITY IN Parts Per			
· ·		1		tron (Fe)	Chie	rides (CI)		
		 						
				Hardness _	Othe	·		
				12 WELL HEAD	COMPLETION:	In Approved Pi	1	
		1				12" Above Gra		
					od? Tes No			
		<u></u>		·	ement Benton			
				Depin: Fro	omf1,	toft.		
				14 Nearest Sou	irce of possible c	noisenimesec		
			- -			on _ 5ep71		
		<u> </u>			ected upon comple	ion Kves N	3	
	_			15 PUMP:	多 、	ot installed		
	<u>-</u>			Manufactor	or's Name			
	_			Model Num	Der	HP Volts		
	·· -	<u> </u>	· .	Length of C	rop Pipet	. capacityG	.P.M.	
		1		Type: 🔲	Submersible	•	•	
		ļ <u>.</u>			Jet [Reciprocating		
}								
USE A 2ND SHEET I		<u> </u>	12	<u></u>				
16 Remarks, elevation, source					CTOR'S CERTIFI			
ADDED 19170. BY DRILLER, 11	EN NE		10 The be	est of my knowle	edge and belief.	n and this report i	» true	
E GERECTED FO	·		/Yen	ald E We	ATherly	O 79	4	
•. viRRECTED EY:					-		TION NO.	
ee'ncriou me			Address	3945 V.	an Ston	ic Dr		
בוים אכודוסח:				<i>a</i> .	- ~		أممينيو	
			Signed <u>(</u>	Thomas !	"Wanthe	4 Date 2	-24.01	
D624 100M (Rev. 12-68)				一つしゃにゃってもこ 月毛!	-~L DE * + * T V E			

FEB 16/3	WATER \		ORD MICHIGAN DEPARTMENT
1 LOCATION OF WELL		· /	1 PUBLIC HEALTH
Count Township Rame	7	Fraction	Section Number Town transfer Range Number
Distinct 405 Direction from Read Intersections	na my	0, 705	3 ON : E - DI NOCE :
1,00	•	• .	Descharlles Denders
· · · · · · · · · · · · · · · · · · ·	1.1 · · · · · ·	······································	Address 3881 Highland Kd
Street address & City of Well Location	<u> </u>	<u> </u>	fortice Thick
Locale with "X" in section below Sketch	n Map;	. –	4 WELL DEPTH: (completed) Date of Completion
			32' n. 8/7/
 			Cable tool
┃ * <mark>├</mark> - - - - -			6 USE: Somestic Public Supply Industry
			Irrigation Air Conditioning Commercial
			Test Wetl
<u></u>		1	7 CASING: Thresded Welded Height: Above/Below Diam.
	THICKNESS	CE#TH TO	Surfaceft.
FORMATION	OF STRATUM	BOTTATUM	nutoft. Depth Drive Shoe? Yes 7 No
No -1.1		X /	8 SCREEN:
price .		9/	Type: This Sky Die.:
Dhue (1/4.	11	1/2	Slot Cauze Length
	امون ا	·	Set between the fit, and the
Jand.	Jo'	32	Dream Wed.
	`		9 STATIC WATER LEVEL
			ft. below land surface 10 PUMPING LEVEL below land surface
·			ft, after hrs. pumping g.p.m.
			tt, alter hrs. pumpring g.p.m.
			11 WATER QUALITY in Parts Per Million: Iron iFel Chlorides (CII
·			Chiefles (CII
	·		MarchessOther
			12 WELL HEAD COMPLETION: In Approved Pit
			Pitless Adapter 2" Above Grade
		1	Nest Cement Bentonite
			Dectn: Fromft. toft.
	<u> </u>		14 Nearest Source of possible committee
21 1030 + 10 WZ	1		Me. a sintested upon completion Dies Tha
eta: 1030 = 10 m² St.wel 1000 = 10			15 PUMP: Not installed
Stw ed 1000=	Σ		Manufacturer's Name
	(1)		Model Number HPVolts
			Length of Drop Pipeft, capacityG.P.M.
•••	_		Type Submersible Just Reciprocating
\ ·	577		Jet Reciprocating
USE A 2ND SHEET AF NEEDED	<i>FC/</i>		
16 Remarks, elevation, source of data, etc.		17 WATER	WELL CONTRACTOR'S CERTIFICATION:
ADDED Perc. or oriently that day		to the	SI A CONTROL SE DELIE
		AEGI	WELL CONTRACTIONS CENTIFICATION: Lowas Artifec under my juncticion and this report is Established believe to believe the property of the pro
CORPERTED BY:		Address	6283 Clandane (Kitsto
			Alle -1 (-1-1
• MEDITION BY		Signed _	1 Ward Date 7/7/

1 LOCATION OF WELL				PUBLIC HEALTH
County	Township Name		Figetion	to the property of the second second to the second
Dakland	Highland			14 3 N/ 7 E/
Distance And Direction from Reac	I Intersections			3 OWNER IS MICE
			•	Beauty Craft Inc.
				Address 2294 Williams Lk. Rd.
Street address & City of Well Loc	31:0n	·,		Pontiac. Mich.
Locala with "X" in section he	low Sketci	h Mag:		4 WELL DEPT (completed) Date of Completion
				68 ". 1/20/71
!				5 Cable too: Rotary Driven Dug
				☐ Hollov. rad ☑ Jetted ☐ Bored ☐
 "				6 USE: Domestic Public Supply Industry
	•			Irrigation Air Conditioning Commercial
				Test Well
			•	7 CASING: Threaded Weided Height: Above/Below
I MILE		*********		Surface
2 FORMATIC	0N	THICKNESS OF	ECTTON OF	2 - to 65 ft. Depth Weight ibs./ft.
<u> </u>		STRATUM	57=47y4	19 control
6 4 65				B SCREEN:
Sand Clay		22		Type: 810t Dia: 1%
63				Stot/GauzeLength3
Clay		25	47	Set between <u>65</u> ft. and <u>68</u> ft.
W-11		- 40		Fittings:
Yellow gravel		10	57	BIRAMET VALVE
Dlum mlau		7	<i>c</i> 1.	1 7
Olue clay			64	10 PUMPING LEVEL below land surface
Water send		4	68	55 ft. after 4 hrs. pumping 41. g.p.m.
POLET DRILL			00	B.D.M.
•				ft. afterhrs. bumping g.p.m.
:				11 WATER QUALITY IN Parts Per Million:
]		tron (Fe) Chlorides (CI)
	······································		-	
				HardnessOther
	······································			12 WELL HEAD COMPLETION: In Approved Pit
				Y = 1:ess Adapter
				13 Netl Groutes? Thes No
	· · · · · · · · · · · · · · · · · · ·			Nez: Cement Bentonite
				Depth: Fig
				,
				50 feet We Direction Septic Type Well dis risated upon completion Ves No
		ii		lie
' 			į.	Manufacturer's Name Mypps
				, ,
				Model Number HD50DT26 HP 1/2 Volts 110
				Length of Drop Pipe 42 ft. capacity 48 G.P.M. Type: Submersible
				l = _
	,- ,- ,- ,- ,- ,- ,- ,- ,- ,- ,- ,			Jet Reciprocating
USE A 2HD SHEET II	F HEEDED			
16 Remarks, elevation, source	of data, etc.			WELL CONTRACTOR'S CERTIFICATION:
	•1 · 100			I was drilled under my jurisdiction and this report is true as of my knowledge and belief.
		ĺ		al nne Well Drilling 0140
THE EVA			-1 61	STEREC BUSINESS NAME # REGISTRATION NO
•			4001255	1055 Wymen Pontiac, Mich.
Leave Mark EM				
			Signed _	AUTHOR DES REPRESENTATIVE
D67d 100M (Rev. 12-68)				HANNEY AND TRUTHSTAND 1

1 LOCATION OF WELL				-		PUBLIC HEA	LTH
County	Township trame		119: 1100		Section Number	1	Range Number
Oakland.	Highland	/	5 8 5	ENF	14	3 N/8.	7 F E/W.
Distance And Direction from Road	1 1016/15/0 110/15			3 OWNER OF	HELL: Raglin	. 7 . 1	
				1	1539114	608/ 6	
					Elizabeth	Lake Rd	
Street address & City of Well Loc	ation white		1		Hilford.		
Locate with "x" in section be		h Map:		4 WELL DEPTH	(; (completed)	Date of Completion	
				l .	32 n.	3-18-71	•
				5 Caple to			
				Mollow	_		⊒•
• 				6 USE: Do			Industry
					_	Conditioning	
				☐ ₇	_		,
]						Height: Abo	va/Relow
1 4110				Diam.		Surface	
		THICKNESS	SEPTH TO	2	26 11. Dept		
2 FORMATIO	DN .	DF STEATUM	STRATUM	ľ		h Drive Shoe?	
1	 	1		8 SCREEN:		12:12: 5::5€	
ONKNOWN			21	3000 110	Ton Mark		:
1			· ·				· · · · · · · · · · · · · · · · · · ·
Y=110 = c/24		3	24		2 % ft. and _		
1				Futtines:	ZO Blank	cheek i	12/-4
Hard PON		2	26				
				9 STATIC WAT	ER LEVEL		
water Bearin	10 52 Nd		32		ft. below land su	rtace	
				10 PUMPING L	EVEL below land	Surface	
·					ft. after 🖊 hrs. i	oumping	9.p.m.
ļ							
<u> </u>					ft. after hrs.		g.p.m.
					LLITY in Parts Per		
				Iran (Fe)	Chlor	ides (CI)	
						•	
	·			Hardness _	Other	In Approved Pr	
				B.			
		<u> </u>	<u> </u>		d? Yes No	12" Above Gra	de
				_	ement Benton		
		 					
				14 Nearest Sou	ice of possible co	ntamination	
				5 3 toos	Directi	on SepT	ر Type
1		!!!		Well cisinfe	cted upon comple	on X Yes No	•
				15 PUMP:		or installed	
			_	Manufacture	n's Name _ Me		
						HP <u>1/2</u> Volts	110
						. capacity 8 G.	
				Type: S		_	
				<u> </u>		Reciprocating	
: - 					_		İ
USE A 2ND SHEET IF				l			
16 Remarks, elevation, source	of data, etc.	•			CTOR'S CERTIFI		
			to the be	st of my knowle	dge and belief.	n and this report i	
	·		Roman	INE Wes	Therry	079	-/
			Address	3945 N V	2~ STONE	- Miltord	<u>′</u>
	<u> </u>		Signed 6	Amalal E	Willer	L Date 4-5	-2/

ا يال

	WATER Y			,	MICHIGAN DEPA	ARTMENT
1 LOCATION OF WELL	ACTZ	PA TE	.5		OF PUBLIC HEA	LTH
County: Township Name		Fraction		Section Number	Town Number	Range Number
Chakland Singhland	<i>(</i> .	1/4	% %	11	3 N/G	7) E/W.
Distance And Direction from Road Intersections			3 OWNER OF	VELL:	,	
-				7		
Street address & Com of Well Leaving	[:		Address			
Street eggiess & Cità Ot Mett Cocation		<u> </u>				
Cocale with A in section below. Sketc	h Mag:		4 WELL CEPTH	; (completed) [Date of Completion	
			76	ft.	July.	1982
			5 Cable to			2 ***
•			6 USE Don			
					rc Supply L Conditioning [Industry Commercial
┃ ┝╶╶┽╴╶┼╴╾┧ ┊ ┉╴				=	Conditioning [) commercial
	•		7 CASING: Th	readed Welder	Height: Abi	ove/Below
1 MILE			Diam.		Surface	/n.
2 FORMATION	THICKNESS	DEPTH TO	<u></u> 5.in. 10	11. Dept	h Weight	lbs. /ft.
, CONMITTON	STRATUM	STRATUM	in. to	ft. Dept	h Drive Shoe	Yes No
1 4	1	6.	8 SCREEN:	. / <		, ,,
Ald Sund 2 xhares.	 	(~	Type:	mus d	ight	
J'me Les Chay	}		Stat/Gauze		_ Length	*
	-	· · · · · · · · · · · · · · · · · · ·	Set between	the and	42 11.	
Till Clay, Jand & Grant	5'	18'	Fittings:	Packer	HP.K	Hench.
3 - 1			9 STATIC WATE	ER LEVEL		
May dand 1 xhand	1-1	2,,_	12	ft, below land su	rtace	_
1 3	7,7	64	10 PUMPING L	EVEL below land	Surface	
(Sellier She a & Arene)	<u> </u>		40	ft. efter 🚄 hrs. I	oumping35	9.p.m.
10/2 1/2/2	1 .					
Drawy rating to which.	 			ft. after hrs. (LITY in Parts Per		g.p.m.
= had & Lanel	13'	45.	}	Chlor	•	
	 		1.0 1 0.7			
when (lay (Allen)	<u> </u>		Hardness _			
. /					In Approved Pr	
	ļ <u>.</u>	 -	7 Pi	less Adapter	12" Above Gra	ede
·	ļ			d? Yes No ement Benton		
	57		Depth: Fro	1/3	73	
	1740	· _	14 Nearest Sou	rce of possible co		
		4.3	30 1eer	Directi	on Just	Type
	<u> </u>			cted upon comple		
CORED MED BY DRILLER, USM MC	1,687	77	15 PUMP:	وح	of installed	
Appen	 		Manufacture		HP 2 Volts	
CCRRECTED BY			Model Numb		. capacity /O G	
ELEVATION BY			Type:		. Especity G	.P.M.
OFFIN TO BUCK	┧ <u>.</u>		. =	Jet [Asciprocating	
				_	•	ļ
USE A 2HD SHEET IF HEEDED	<u> </u>					
16 Remarks, elevation, source of data, etc.				CTOR'S CERTIFI		is true
-\$6P 2	7 (5.12	10 the be	si of me knowle	dge and belief.	i'sve	6558
		REGIS	STERED BUSINESS			ATION NO.
		Address	/ . //	amken	- Clas	115 how
5		Jagoress		 		1.10
		Signed_	4 60	ull.	Date <u> </u>	· Cey 82
D67d 1009 (Rev. 12-68)			AUTHORIZED REP	RESENTATIVE		,

1 LOCATION OF WELL 12 1984			PUBLIC HEALTH
County Township Name		Fraction	Section Number Town Number Runge Number
DAKLAND HOM ROAD HICKLAND		٠,	11 7 N/8. 7 E/W.
Distance And Direction from Road Intersections	_		3 OWNER OF WELL.
,		,	
-			Addres
!	•		
Street address & City of Well Location		~ .	
Locate with "X" in section helow Sketch	h Mao:		4 WELL DEPTH: (Completed) Date of Completion
			(2 11. 7/24/83
			5 Cable tool & Actary Driven Dug
			☐ Hollow rod ☐ Jetted ☐ Bored ☐
┃ * ├			
			Itrigation Air Conditioning Commercial
			Test Well
 			7 CASING: Threaded Welded Height: Above/Balow
land turks and	· · · · · · · · · · · · · · · · · · ·	·	Surfaceft.
2 FORMATION	THICENESS	DEPTH TO	4 in to Satt. Depth Weight 1 lbs./ft.
	STRATE	STRATUM	in. toft. Depth Drive Shoe? Yes No
00 10			8 SCREEN:
RRSDAGR	13	12	Type: Joh NSGA Dia: 4"
			
GRABE CJ+6R	3	16	Siot/GauseLength
The same of the sa	 	12	Set between 48 ft. and 42 ft.
MITESDIGE	10	26	Fittings:
W/E 311+ 30	10	N E	18
11. 0.		2	9 STATIC WATER LEVEL
/ (X/Z) /AN	26	53	11. below land surface
	(1	بر حسر	10 PUMPING LEVEL below land surface
THE GR SD	<u> </u>	56	50 ft. after hrs. pumping 8 g.p.m.
70 =0			
GR WTR SO	6	62	ft. after hrs. pumping g.p.m.
			11 WATER QUALITY IN Parts Per Million:
<u> </u>	! '		Iron (Fe) Chlorides (CI)
			HardnessOther
5			12 WELL HEAD COMPLETION: In Approved Pit
	<u> </u>		Pritiess Adapter 12" Above Grade
	 	-	13 Weil Grouted? Yes No
	ŀ		Neat Cement Bentonite
	 		1 <u></u>
]		Denth: From tt. 10 ft. 14 Nearest Source of possible contamination /
			
	j		
	 		Well disinfected upon completion Wes No 15 PUMP:
			Not installed
	ļ		Manufacturer's Name MYELS 5241 52
			Model Number 5-// HP 2 Voits 276.
			Length of Drop Pipe (1) ft. capacity 10 G.P.M.
1.1		,	Type: 😡 Submersible
	<u> </u> i		Jet Reciprocating
USE A ZND SHEET IF NECDED			
16 Remarks, elevation, source of data, etc.	•	17 WATER	WELL CONTRACTOR'S CERTIFICATION:
		This well	was drilled under my jurisdiction and this report is true
AUDED INFO BY DRIELER, HAM MEL		to the tre	It is my not 111/11 Doill
*CORRECTED BY	į į	ALGI	STERES BUSINES NAME REGISTRATION OF
* * ADDITION BY	·		11. 17.
ELEVATION	· ' i	Address	10117 CKNSE HAKKAND
DEPTH TO ROCK			KH1, 1 2-3
		Signed 9	Date KUG 5, 85
D67d 100M (Rev. 12-68)			HOSPURIZED REPRESENTATIVE

		•		
MAY 1 U 1984 W	ER WELL A	AC: 368 PA	1MP HECU	PERMIT NUMBER
Datelond Hich	land	HEVA	NEWNEY 1	wn Number Range Number 7 E/W
C-			3 OWNER OF WELL	
Street DOTESS OF CHIP OF WENT COCENON			Address Same As Well Location?	□Ves □ No
Locate with 'x' in Section Below	Shatch Mas		4 WELL DEPTH (completed) [3 0 It]	Date of Completion 4-14-83 □ Driven □ Dug
- - - - - - - - - -			6 USE Comessic Type I Pub	Jetted
			Type IIb Pi Tope IIb Pi Tope IIb Pi Tope IIb Pi Tope IIb Pi Tope IIb Pi Tope IIb Pi Tope IIb Pi	
2 FORMATION DESCRIPTION	THICKNESS	DEPTH TO	Plastic Welded	Surface
5.1 D1.	STRATUM	STRATUM	Grouted Drill Hole Drameter	Drive Shoe Yes
Sund Drove	22	27	B SCREEN Type 5 'Dian	Not installed
			Sei beiween 27 H an	gih3 1/2 '
Water Grovel	3	30	FITTINGS K-Packer Lea Blank above screen 1 9 STATIC WATER LEVEL	d Packer Bremer Check Other
	·		10 PUMPING LEVEL below land surface	•
			ti alter hrs pur	•
			11 WELL HEAD COMPLETION Basement of	=
			12 WELL GROUTED' No	Yes From 10 1t
			No of bags of cement Add	
Mich	RECEIVE	D	· · · · · · · · · · · · · · · · · · ·	5011 Direction 1
	Dept. of Pub	}	14 PUMP C Installed Manufacturer's name	Pump Installation Only
Burea	u of Engironme	ntal and	Model number	t capacity GPM
Occuj	pational-Health	- GWQS	TYPE Submersible [PRESSURE TANK	Jer
USE A 2HD SHEET IN NEIDED	<u></u>	16 WATE	Manufacturer's name	Capacity Gallons
15 Remarks, elevation, source of data, etc		This we	II was drilled under my jurisdiction and the est of my knowledge and belief	
CORNECTE BY *ADDITION BY ELEVATION		Address	REGISTERED BUSINESS NAME 26/12 Masslew	REGISTRATION NO . J. Den
DEP1H 10 RDCA (Sev 10-80-		Signe	AUTHORIZED REPRESENTATIVE	Date 2-12-84
			10 mg mg mg mg mg mg mg mg mg mg mg mg mg	
, v .,			3.4	

,			
	WATER V		
1 LOCATION OF WELL	ACT 29	4 PA 196	OF PUBLIC HEALTH
County Township Name		Fraction	Section Number Town Number Range Number
rational Mada	T. Comments	61. 140	F 4 A/E' 11 3 N/S. 7 E/W.
Distance And Direction from Road Intersections		<u> </u>	3 OWNER OF WELL:
The state of the s	<u>, (-)</u>		
			Address
Street address & City of Well Location 2861 Chez	Man		
Locale with XX in section below Sketch	Map:		4 WELL DEPTH: (completed) Date of Completion
			46 11. 2-15-84
<u> </u>			5 🖸 Cable tool 📗 Rotary 📗 Driven 📗 Diag
			Hollow rod Jetted Bared
[™] ┝╶┩╌┼┈┼┈┤ ╸ ┰			6 USE: Domestic Public Supply Industry
			Irrigation Air Conditioning Commercial
			Test Well
<u> </u>			7 CASING: Threaded Welded Height: Above/Below Diam.
Hamiltonia Market	THICKNESS	DEPTH TO	Surfaceft.
2 FORMATION	OF	BOTTOM OF	in. 10ft. Depth Weight/_ lbs./ft.
	STRATUM	STRATUM	B SCREEN:
and Bismel Suddle	21	- /	Type:
Est State St	/	<u>-1</u> /	Type: Dia.:
Clay Grand	16	37	Siot/Gauze 10 Length 4 11 Set between 4.2 ft. and 4/6 ft.
The second			
In Il branch / 11 Man	9	46	Fittings: 1 tasker - Flugt Juf Fife
		7	9 STATIC WATER LEVEL
	j		tt. below land surface
			10 PUMPING LEVEL below land surface
			26_ II. after 4 hrs. pumping 25 g.p.m.
			11 WATER QUALITY in Parts Per Million:
			Iron (Fe) Chlorides (CI)
			12 WELL HEAD COMPLETION: In Approved Pit
•	-		Pitless Adapter 12" Above Grade
			13 Well Grouted? Yes No
			Neat Cement Bentonite
(5)	/e 2	٠.	14 Nearest Source of possible contamination
			Hoet Med Direction Type
· · · · · · · · · · · · · · · · · · ·	,- 10	_	Well disinfected upon completion Yes No
DECEMEN	, - i -		15 PUMP: Not installed
RECEIVED \-			Manufacturer's Name Task Volts 5000
			Model Number 5 DL HR 2 Valls 2000
100 7 1005			Length of Drop Pipe 26 tt. capacity 6 G.P.M.
المراد - المراد			Type: 🕤 Submersible
Europa of Environmental and	 		Jet Reciprocating
Occupational Harter GWOO	[
16 Remarks, elevation, source of data, etc.	<u> </u>	17 WATER V	VELL CONTRACTO: CERTIFICATION:
		This well	was drilled under my sessiction and this report is true
		10 the be	at of my knowledge and belief.
		REGIS	TERED BUSINESS MAME REGISTRATION NO.
		Address	carry m hand it is nightered
]		· · · · · · · · · · · · · · · · · · ·

100M (Rev. 1.2-68-

WALLER WELL AND PUMP RECO PERMIT NUMBER 1 LOCATION OF WELL County Township Name Town Number Range Number Highland sw "ne-" se Oakland E/W 3 OWNER OF WELL Distance And Direction From Road Intersection Addre T Yes No Address Same As Well Location? Street Address & City of Well Location WELL DEPTH (completed) Locate with "X" in Section Below Sketch Mep DB-19-84** Cable tool Rotary Driven Due Hollow rod Auger Jetted X 6 USE. Domestic Type III Public Type I Public Irrigation Type IIa Public Meat pump Dew seet Type IIb Public CASING: Sleel Threaded Height: Above 53000 Plastic Welded Surface _____ H_ THICKNESS DEPTH TO Weight 10.4Q. /1 FORMATION DESCRIPTION STRATUM OF STRATUM It denth 10 to Grouted Drall Hole Diameter Ø Yes Drive Shoe _ in to _____ It. depth 40 □ No drove n to _____ft. depth 45 Men installed 5 med. sand-water Johnson Diameter 481m. Slot/GXXX Set between 41 It and 45 FITTINGS K-Packer Lead Packer Bremer Check Blank above screen 9 STATIC WATER LEVEL 21 ______ft below land surface
10 PUMPING LEVEL: below land surface
21 ______ ☐ Flow 60 ft. after _ ____ hrs_pumping at _ ft. after _____ hrs. pumping at ____ 11 WELL HEAD Pitless adapter 12" above grade COMPLETION Basement offset Approved pit 12 WELL GROUTED? KNO Yes From _____ to __ Neat cement Bectonite Other _ No of bags of cement ____ 13 Nearest source of possible contamination skiks septic 54 west It Direction Not installed Pump Installation Only Manufacturer's name Red Jacket Model number ______ HP 220_ Volts 1/2 _ft capacity _10_ Length of Drop Pipe _____ G P M TYPE Submersible PRESSURE TANK Manufacturer's name RECEIVED USE A 240 SHEET WHEELE DEPt. Of Public Haalih Model number Gallons Capacity. 16. WATER WELL CONTRACTOR'S CERTIFICATION 15 Remarks, elevation, source of data, etc. M#41 6 IS55 This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief Pettic Well Drilling 0413

REGISTRE BUSINESS NAMED BLVd. DESISTATION NOT BLVd. Davisburg Bureso of Environmental and

4 PNS one 5-13-85 Completion: Required Conviction of a violation

Penalty:

Copupational Health - GWQS

D67d 2:84

О	F			
. ~	46		+	

1 LOCATION OF WELL			
County Two		French	WSW Section No Town Range 3 N/K 7 E.M.
DECEMBER 1881 CH	1.	MEN	454 / - 3 N/2 7 EM
Distance And Direction from Road Intersections		146.77	
O STORE AND COVERIGHT FOR AGE INTERSECTIONS	WNER No		3 OANER OF WELL COMFORT HOMES /NC.
			CONTROL 110 CS 1 CC.
		_	Addin 2376 NMILFORD RIS
Street address & City of Well Location		111	23/6/1/1/2/
	THICKNESS	DEPTH TO	4 WELL DEPTH: (completed) Date of Completion
2 FORMATION	OF	BOTTOM OF	7 Well Der III (completed) Date of Completion
	STRATUM	STRATUM	53-0 ft. JAN 1770 5
		1 .	5 12 Cable tool Rotory Driven Dug
5 4 1 D	1.70	1/8	Hollow rad Jerred Bored
		<u> </u>	6 USE D'Damostic D Public Supply Industry
4 4 1 1 2 2 1	5 25	43	1rrigation Air Conditioning Commercial
AJ SUN SAND	+	1-7-5	The sum of the sum of
_	1 -		Tost Well
147	3	76	7 CASING: Threaded Welded Height: Abeve/Below
	}]	4in. to 47ft. Depth surface ft.
HATCH SAND	1 7	53	Weightba/ft.
		 	, , , , , , , , , , , , , , , , , , ,
	j		in. toit. Depth Drive Shoe 2 Yes No
	 	 	8 SCREEN
	1	1	Type STAINLESS Die: 3 Ty
	<u> </u>		
			Slot/Gauze .015 Length 15.9
		•	Set between 49 ft. and 5-3 ft.
		 	1
	1		Fittings: KPAKER Y BLANK
	1	İ	9 STATIC WATER LEVEL
•	1		3 2_ft. below land surface
		†	10 PUMPING LEVEL below lend surface
	1 .		
	-	 	? ft. ofter thrs. pumping
·	1.	ł	to allow the second of
·	[fi, ofterhrs. pumpingg.p.m.
			11 WATER QUALITY in Ports Per Million:
		i	Iran (Fe)Chlorides (CI)
		 	Chierioss (CI)
. ,			Hardness
	 		
	1	1	12 WELL HEAD COMPLETION: In Approved Pit
		1	Pitless Adapter 12" Above Grade
		1	13 GROUTING:
	ļ		Well Grouled? Yes No
<u> </u>	+	i ·	Material: Neat Coment
		I	Depth: Fromit. toft.
·	1	1	<u> </u>
•		1	14 SANITARY:
		<u> </u>	Negrest Source of possible contamination
	i		15 feet & Direction SEPT, Cype
	1	1	Well disinfected upon completion X Yes No
	- 	 	15 PUMP:
•	1	ļ	KIN JAKKST I
		<u> </u>	Manufacturer's Name
		i	Mode! NumberHP
		1	Length of Deap Pipe 45 ft. capacity 15 G.P.M.
			Type: Al Submersible
		1 .	☐ Jet ☐ Reciproceting
36 -		17	
16 Remarks, elevation, source of data, etc.		1	WELL CONTRACTOR'S CERTIFICATION:
i e e e e e e e e e e e e e e e e e e e			II was drilled under my jurisdiction and this report is true
		10 the be	est of my knowledge and balled.
		1/1	Gamas Riorsian 0781
·			ECISTERED BUSINESS NAME REGISTRATION NO.
1			47.25 WhITE LAKE RD
	•	1	11/1 11/1 1
		Signed	17 home (15 - Je Date 10/47)
<u> </u>		-	SVITATING SENTATIVE
		=	

FEB 2 3 1976	WATER \		
County / Company to me / a		Fraction	See toom from the Constitution to the Prince Number
Losson or And Dignam From Property of trades Q		5255	5. UN 15 3 NA 7 EX
			Address MILFORDRE
Locate with "A" in section below. Ske	tch Map;		4 WELL DEPTH. Icompleted. Date of Completion
	757		5 Caple too! Potary Driven Dup
	1, 0	\mathcal{I}_{α}	Hollow rod Jelles Bored
X X	/ Olor	N	6 USE: Domestic Public Supply Industry
	المر الحس		Tesi Well
	100		7 CASING: Threaded Weided Fleight: Above Soloniam. Surface 1.
2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BUTTOW OF STEATUM	4 in. to 1. Decth Keight lbs. ft.
	,		8 SCREEN:
Congt Sand.	114	44'	Type: Statules St. Dia: 3" Stot/Gene 12 Length 3"
Sand	17	61	Set betweenft. andft.
;			Fittings: SLNECK PLUS COUPLING
			9 STATIC WATER LEVEL
ļ			/ ft. below land surface 10 PUMPING LEVEL below land surface
: 			33 It. after 1 hrs. pumping 20+ g.p.m.
. —			ft. after hrs. oumping g.a.m.
		-	11 WATER QUALITY in Parts Per Million:
			tron (Fel Chlorides (Ci)
			MardnessOther
			12 WELL HEAD COMPLETION: In Approved Pit
N DEPT. C.	+		13 West Grouted? Ves 1:0
THE OFFI CA			Neat Cement Bentonite
13/5 E			Oepth: From tt. tc t; 14 Nearest Source of possible contamination
Z		.,	feetDirectionType
(5)			Well disinfected upon completion [Nes [] No. 15 PUMP: [] Not installed
2 2			Manufacturer's Name Rod JA-1-C+
EHH	:		Model Number MP 1/2 Volts 27
			Length of Droo Pipett. capacity_/G,P.M. Type:c.bmersible
			Jet Reciprocating
USC A 2MD SMEET IF WEEDED			•
16 Remarks, elevation, source of data, etc.	DB	Thiswel	NELL CONTRACTOR'S CERTIFICATION I was drilled under my jurisdiction and this report is true at of my knowledge and befre
AUCED INFO BY DRILLE	R. ITEM MO.		STERED BUSINESS NAME REGISTRATION NO.
*CORRECTED BY **ADDITION BY			
ELEVATION			
D67d 100W (Rev. 12-68	:36	Signed_	AUTHORIZES REFEESENTATIVE

				•
- C 16/5		•		,
		WATER N	WELL REG	CORD MICHIGAN DEPARTMENT
1 LOCATION OF WELL				NE NE PUBLIC HEALTH
Oakland	Highland		1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	Section Number Town Number Range Number of 23 N/S. 7 E/W.
Distance And Disaction from Road to	ntersections			3 OWNER OF WELL: Johnson Homes
المنادات المواقعة العاليك العجاميسي	y			Address 0.0.0 470
Street address & City of Well Locat				P.O. Gox 179 Union Lake
Locate with "X" in section help		h Map:		4 WELL DEPTH: (completed) Date of Completion
	•			5 n. 9-24-74
		•		5 Cable tool Rotary Driven Dug
*				Mollow rod Jetted Bored 5
				Irrigation Air Conditioning Commercial
				Test Well
				7 CASING: Threaded Welded Height: Above/9666 Surface 1 ft.
		THICKNESS	DEPTH TO	2_in. to 47_ft. Depth Weight 3.75bs./ft.
FORMATION	l	OF STRATUM	BOTTOM OF STRATUM	in. tofs. Depth Drive Shoe? Yes No 🔀
			4.5	8 SCREEN:
Stood pipe in sand	- drove	42	42	Type: Slotted Dia.: 12" Stot/Gauze 12 Length 4 ft.
Haten chavel		9	51	Set between 47 ft. and 51 ft.
,				Fittings;
		<u> </u>		9 STATIC WATER LEVEL
		<u> </u>		14ft. below land surface
	•]	<u>'</u>	10 PUMPING LEVEL below land surface
		 		ft. after hrs. pumping g.p.m.
		}	1	ft. efter hrs. pumping g.p.m.
				11 WATER QUALITY in Parts Per Million:
		ļ ———		Iron (Fe) Chlorides (CI)
			İ	HardnessOther
				12 WELL HEAD COMPLETION: In Approved Pit
	OF P	The same of	<u> </u>	IZ Pitless Adepter 12" Above Grade
•	A THE	O. S.	(·	Well Grouted? Yes 4- No Neat Cement Bentonite
	10/	1.3 /1.	E N	Depth: Fromtt. tott.
 		75	7 ii	14 Nearest Source of possible contamination 50 feet Direction Sentic Lank Type
				Well disinfected upon completion \$\times \text{Yes} \tag{No}
	1:-1	10 /	Į.	15 PUMP: Not installed
	L'area	-	1	Manufacturar's Name
• •	St.	EKK		Model Number HP Volts Length of Drop Pipe It. capacity G.P.M.
		-		Type: Submersible
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	· .	ļ		Jet Aeciprocating
,	IFEREN]
6 Remarks, elevation, source o	gaja, etc.		1	WELL CONTRACTOR'S CERTIFICATION:
· · · · · · · · · · · · · · · · · · ·	<i>" J</i>		to the be	I was drilled under my jurisdiction and this report is true ist of my knowledge and belief;
£ \$	7.	•	Fet	tin [1] / / / / / / / / / / / / / / / / / / /
2.443. 3.3.	•	!	Ì	
				1051 Sound Lake, Soud
· · · · · · · · · · · · · · · · · · ·	·····		Signed	ANTHORIZED REPRESENTATIVE

OCT 0 2 1975	WATER V			· ·	HICHIGAN DEP	ARTMENT	r
1 LOCATION OF WELL	AC1 25	- PA 190			PUBLIC HEA	ALTH	
County Township Name		51.K 1100	NE SES	irtion Number	Town Number	Range I	Number
Oakland Highland .		98	1.6	2	3 N里.	7	Ε/ 3 .
Distance And Direction from Road Intersections			3 OWNER OF WE	u:		•	
Territory 1 Spirit	ron anial H	6.5.2	Address				
Street address & City of Well Location'			Ģ		·	کے	
	h.Map:		4 WELL DEPTH:	(completed)	Date of Completio	on.	
			178	n. A	ug., 1975		
┫┡╼╃╾ ╀ ╌╀		•	5 🗶 Cable tool	Rola		en (Dug
			Hollow roc			<u> </u>	<u> </u>
			6 use: Dome:	_	c Supply	_] ^dusti	-
h + 1			☐ Irrigal	=	Conditioning [_) Comme	110181
			7 CASING: The		Height: Ab	ove/Res	
1 MILE			Diam.	_	Surface		
2 FORMATION	THICKNESS	BEPTH TO	4in. to	174 It. Dept			
	STRATUM	MUTARTS	B SCREEN:	It. Dent	Drive Shoe	Yes Z	No 🗍
		4			- 2 E/el	,	
Brain clasy sand	17*	17*			_ Dia.: <u>3 5/8¹</u> _ Length	60	
Brown Land, some gravel	150	32 •	Set between 7	74 ft. and _	178 n.		
			Fittings:				
Grey clay	04"	361		Packer	 		· · · · ·
			9 STATIC WATER	-			
Brown sand, some gravel	27*	63"	10 PUMPING LEV	, below land sur /EL below land			
Grey sandy clay, some gravel	110*	173*	1		pumping 12	0.0	.m.
			1				
Grey coarse water-bearing sand	05°	178*		. after hrs. (g.p	.m.
			11 WATER QUAL				
	 			Chie	ides (CI)		
			Hardness	Other			
			12 WELL HEAD C	OMPLETION:	In Approved F	it	
		 			12" Above G	ade	
			13 Well Grouted?	Yes X No meni Benton			
1	 		. –	ment Benton			
1 25%			14 Nearest Source				
7.46			_50_1ee: _	Directi	∞ <u>Septic</u>		T,pe
1	ļ				tion Y Yes 🔲 I	No	
:975			15 PUMP:		ta-Rite		1
13/3 151			Manufacturer* Model Number		HP3/4 Voll	92	0
101			P.		. capacity £(
			Type: Sul	• • • •		-	
EHNO.		_		, (Asciprocating		
The state of the s							
16 Remarks, elevation, source of data, etc.	L	17 WATER	WELL CONTRAC	TOR'S CERTIFI	CATION:		
ADDED INFO BY DRILLER, ITEM NO.	REK	This wel	I was drilled unde	r my jurisdictio		is true	
I DUILLER NO	/ - / /		ist of my knowledg	ue and Deliel.			
*CORRECTED BY	75			-	BAA	<u> </u>	
CONRECTED BY	7-2:	Jame	A N. Layman	N		ATION NO.	
CONRECTED BY CONRECTED BY ELEVATION	7- Si	Jame	A N. Layman	N			
CONRECTED BY	7-Si 1	Jame		N			

1

MAY 1 0 1984	WATER \	WELL REC	CORD MICHIGAN DEPARTMENT
LOCATION OF WELL	ACT 29	PA 196	65 OF PUBLIC HEALTH
County Township Name		Fraction	
Valland Wallhin	, 	<u> </u>	5 E 45 W 4 9 3 N/S. 7 E/W.
Distance And Direction from Road Intersecubns	• -		3 OWNER OF WELL:
		<u> </u>	Address
Street address & City of Well Location		o	
Locate with 'X' in section below Sketc	h Map:		4 WELL DEPTH: (completed) Date of Completion
			30 11. 4/2/83
·			5 Cable tool Rotary Driven Due
<u> </u>			Hollow rod Jetted Bored
·			6 USE: Domestic Public Supply Industry
	•		
			7 CASING: Threaded Weided Height: Above/Batow
1 MILE			Surfacet.
2 FORMATION	THICKNESS OF	DEPTH TO	
	STRATUM	STRATUM	B SCREEN:
Sent Grenel	24	24	Type: Jed miles - n/(so 1/4
Design sava	7		
Sand Granel Water			Stol/Graze Length 3 FF
			Firminger
Bearing	6	30	Jul pefe + Brener theck
			9 STATIC WATER LEVEL
	 	 	tt, below land surface 10 PUMPING LEVEL below land surface
	1	ļ	15 ft. after hrs. pumping
			ا سر ا
<u> </u>			13 It. afte/2 hrs. pumping
			13 WATER QUALITY in Parts Per Million:
		 	
			HardnessOther
, m			12 WELL HEAD COMPLETION: In Approved Pit
/			Pitless Adapter X 12" Above Grade
			13 Well Grouted? Yes No
	<u> </u>	<u> </u>	Neat Cement Bentonite
ية الله الله الله الله الله الله الله الل	d-i		Depth: From ft. to ft. 14 Nearest Source of possible contamination
		 	55 feet W Direction Septe Type
	1	1	Wetl disinfected upon completion 🔀 Yes 🗌 No
	117		15 PUMP: Not installed
	+-/-	 	Manufacturer's Name
	1-	1	Model Number HP Volts
<u> </u>	 	 	Length of Drop Pipeft, capacity G.P.M. Type: Submersible
RECEI	ΨED		Jet Reciprocating
Mich. Dept. of	Aublic Heal	kh	
USE A 2ND SHEET IF MEEDED	j		
16 Remarks, elevation, source of data, eMAR 2 C	1984	7 har	WELL CONTRACTOR'S CERTIFICATION: If was drilled under my jurisdiction and this report is true
DED INTO BY CRILLER, ITAM NO. Bureau of Environ	omental an	10 112 6	est of the knowledge and option (1). (31)
FURRECTED BY	aith - GWO	AEGI	STERED BUSINESS NAME REGISTRATION NO.
ACCUTION BY	· 4 ·	Address	Place Letter Date 4/2/83
FYATION 10 ROOM			12 1 26 1/22
1 6473		Signed_	4/111. 4x+7, Date 4/-13

GEOLOGICAL SUPVEY NO	WER	WELL	AND PL	JMP RECO	PERMIT NUMBER
1 LOCATION OF WELL	<u>]</u>			· · · · · · · · · · · · · · · · · · ·	
County Oakland	Township Name Highland		Fraction 16	Be 14 De 14 Section Number	3 7
Distance And Direction From Road			SE /4	3 OWNER OF WELL	N/S E/W
1			•		,
I	-			Address	1
	•				
Street Address & City of Well Local Locate with "X" in Section Below		etch Map:		Address Same As Well Loca 4 WELL DEPTH (completed)	Date of Completion
		TIEN MEP.		51 "	88-84
				5 Cable tool Rota	Driven Dug
				Hollow rod Aug	
'* } -				6 USE Domestic Type	t Public Type III Public
)				1 = ' = '	t lla Public
	•				r IIb Public
				7 CASING: Steel Three Diameter Plastic - Well	A SENER
		THICKNESS	DEPTH TO	4 in to 47 ft depth	Surface 1 ft Weight 10 40s //r
2 FORMATION DES	SCRIPTION	STRATUM	SCTTOM OF STRATUM	Grouted Drill Hole Diameter	
bron sand			6	- in to fit, depth	Drive Shoe 🔀 Yes
,				8 SCREEN tt depth	l No
gray sandblu	e clay	33	39	Johnson	Nor installed Diameter
coarse gravel-w	rater sand	12	51	Slot/GERR 12 Set between 47	Length 481n.
				FITTINGS K-Pecker	Lead Packer Bremer Check
·				Blank above screen	ti Other
	!			9 STATIC WATER LEVEL	
				10 PUMPING LEVEL: below land	
				31 tr atter1_ hr	s numaina as ÁS GRM
					s pumping at GPM
					
				11 WELL HEAD Pitiess COMPLETION Basemi	· <u>—</u>
/-	1,0			12 WELL GROUTED? TE No.	Yes From to ti
				Neat cement Ben	tonite Other
			<u> </u>	No of pags of cament	_ Additives
	F.				· · · · · ·
· · ·	- 72°.			ł	ance _55_!! Direction _east
<u> </u>	in.			Well disinfected upon completion	on² 🛣 Yes 📋 No
\r.	Oiline 15			14 PUMP Not Installed	Pump Installation Only
\				Manufacturer's name Rod	Jacket
~	WHT WILL			Model number	HP -1/2 Volts -220
			<u> </u>	Length of Drop Pipe 30 TYPE Submersible	fi capacity GPM
•				PRESSURE TANK	Li Jer
	DEOCNAC			Manufacturer's name	
15 Remarks, elevation, source of			4.5. 10.0 7.	Model number <u>WX203</u>	Capacity Gallons
15 Remarks, elevation, source (ordata: elcheht. Dr. 200:	ะ บรุฐหมุ	This we	R WELL CONTRACTOR'S CERT! Il was drilled under my jurisdiction i	
	WAY 1 6 IS	55		est of my knowledge and belief	•
•		į		ettig Well DRill	ing 0413
	Burele of Environme Occupational Health		Address	AEGISTERED BUSINESS HAME 5575 Jackson E	lvd. Davisburg
	Optional degral	- 67AG2	Signed	Jours & Fetter F	Ne Date 5-1085
D67a 2/84			, angred	AUTHORIZED REPRESENTATION	/L

CHOLOGICAL SONVEY NO	W'ER'	WELL	AND PU	MP REC	(C) =	PERMIT	NUMBER
1 LOCATION OF WELL	Township Name		Fraction	 -	Section Number	Town Number	Range Number
Oakrand	Itigh Land)		M5, SE,	7	3_N/	1 -
Distance And Direction From Road I				3 OWNER OF		1.376	
		7	 -	1		,	
			. ,	Addres			- (7
•	·	·		· ~			
Street Address & City of Well Locati	on				me As Well Locale	on) 🗷 Yes [□ No
Locate with "X" in Section Below		-1-h M		4 WELL DEPT	H (completed)	Date of Comple	tion Card
				53	ħ	: Deck	28-87
╻┝╼┦╼╣╾╣╾┩				5 Cable to		Dr.ven	□ 0~0
				Hollow •	od Auger	betret.	
7				6 USE Don	_		Type III Public
。 ト					= =		Heat pump
				7 CASING.			<u> </u>
been with a second				Diameter 🖺	Steel Three		no/Belem
		THICKNESS	DEPTH TO	<u> </u>	· \U U —	Surface/	/ ft.
2 FORMATION DES	CRIPTION	OF STRATUM	STRATUM	·r t		We ght	los /ft
·	0	1	<u> </u>		l Hole Diameter	l Drive Shoe	ජ γ₅₅
Brown Sun	\mathcal{V}	1 4	4			!	□ No
^ _	\overline{C}			B SCREEN	Co	□ Noj.)	nstalled
Kellow Sun		10	14	Ive Vol	<u> </u>	Diameter 4"	
	0.50		30	Slo: Vauze	<u> </u>	Length	
Bur Grun	eff Jand	16	30	Set between		1 and <u>53.</u>	, դ.
		5	35		X-Packer ,	ALEAS Packer	Bremer Check
grung clay			J J	9 STATIC WAT		ft Other _	
D. + CO-6	9 . •	10	45	30			Plow
· wey same	~ 0				It below land s		
4 allow Sem	Allens Fine	130	75		ft. after Zenrs		′
		_			ft. after hrs		G.P.M G.P.M.
Very fine gra	y Sand	18	93			, , , , , , , , , , , , , , , , , , ,	_ G.F.m.
	V			11 WELL HEAD COMPLETIO		sapter 🔀 12"	above grade
					Basemen	i offset App	roved pil
				.12 WELL GROU	TED' Z No	Yes From	10 11
		- 		Neat cer	ment Bento	nite Other_	
· · · · · · · · · · · · · · · · · · ·		·		No of bags to	ce of possible cont	Additives	
				. See	etie	53no	Ction NE
				.ype	Unie	olie	Ciron
				Well disinfect	ed upon completion	Yes [No
Mich Doct of F	EU	į.		14 PUMP	Not installed	Pump lqs	tallation Only
Mich. Dept. of F	udic Health		(a).	Manufacture	r's name Kas		<u> </u>
JAN 7-	198 5		67	Model numb	" 75 C = 1	<u> 24,2/4</u> v	ons 230
				Length of Dr		fl capacity	GPM GPM
Bureau of Environ	Inental and JAN	i :22 -		_	Submersible	1e:	
Occupational Hea	itu - GWQS	i 1305		PRESSURE T Manufacture	11/74	11 × T	rol
	Ť				202	Capacity	VD
15 Remarks, elevation, source of			. 16 WATER		ACTOR'S CERTIF		Gallons
			This wel	was drilled unde	ri my jurisdiction an		
	•		to me be	est of my knowled 4	sge and belief		63-1154
			7	REGISSIANED BUSIN	I The The	a sine	6 2-1124
			Address	240 1	J. Inter	vale His	Tard
			,	Shirk	0/11		17.78.6.
			Signed _	111111111111111111111111111111111111111		Date	2001

W. ER	WELL	AND PL	JMP RECO	PERMIT NUMBER
1 LOCATION OF WELL County Township Name		Fraction	Section Number Ti	own Number Range Number
Oakland Highland	Q	SEN	SE1/4 SE1/4 Section Sumber 1	3 N/8. 7 E/M
Distance And Direction from Road Intersection			3 OWNER OF WELL	
			Address	
			<u></u>	
Street Address & City of Well Location Locate with "X" in Section Below	Street Marie		Address Same As Well Location? 4 WELL DEPTH (completed)	Ves No
			28 11.	9-20-84
			5 Cable tool Rotary	Driven Dug
			Hollow rod Auger	
╵┯┝╺╺╣╾╾┽╶╌╬╌╶┤┺╦╸			6 USE Comestic Type I Put	blic Type III Public
			trigation Type Ita P	ublic Heat pump
×			7 CASING: Tust Well Type IIb P	
			7 CASING: Sleet Threaded Plastic Welded	
1 MILE	THOCKWESS	DEPTH TO	2 in to 27 ft. depth	Surfaceft Weightft
2 FORMATION DESCRIPTION	STRATUM	STRATUM	in to ft depth	Weight lbs //t
	10.	2.	Grouted Drill Hole Diameter in to ft. depth	Drive Shoe Pyes
Driver	21	21	in to it depth	l No
muel	1 7	28	8 SCREEN	Not installed
gravel	 	00	Type Staisless D.	9 /
	1			gth
	 		FITTINGS R-Packer Le	nd1.
	}		Blank above screen _3 ft	Other
		·	9 STATIC WATER LEVEL:	
	<u> </u>		ft. below land sur	
•		·	10 PUMPING LEVEL: below land surface	
				noing at G P.M
	1		ft. after hrs. pur	nping at G P M.
	1		11 WELL HEAD Pritiess adapt	er 2' above grade
			Basement of	Ξ '
,			12 WELL GROUTED?	Yes From to ft.
			Neat cement Bentonite	Other
	1			
			No of bags of cement Add 13 Nearest source of possible contamil	
			Tros Septer Dissance	5711 Direction 5
DECEMEN	1		'	
RECEIVED			Well disinfected upon completion?	
mich. Dept. of Pathic Master			14 PUMP Not Installed	Pump Installation Only
DEC 1 & 1934			Manufacturer's name	
	ł		Model number	- 1
Surgery of Environmental and			1	Jet G P M
Occupational Heath (GWQS)	<u> 13 </u>		PRESSURE TANK	
	5		Manufacturer's name	
USE A 2ND SHEET P NEEDED	<u> 1 ' 5 </u>	16 WATER	Model number	Gallons
15. Remarks, elevation, source of data, etc.		This we	I) was drilled under my jurisdiction and ti	_
, %	15	io the b	est of my knowledge and belief	1. 12 110-1
	\mathcal{L}	4	REGISTERED RUSHMESS NAME	AGUSTRATION NO G
10 M	(e)/	Address	840 N. Sytus	le Highland Me
(قالق)			Midael How	9-21-84
		Signed	AUTHORIZED ASSESSMENTATIVE	UBIR

Authority: Completion: Pensity:

Act: 368 PA 1978
Required
Conviction of a violation
of any provision is a
misdemosphor

	1	er de de de de de de de de de de de de de	es Tes	· 1 (over‡e H d≱	: 11 1		
		WATER V				місн	IGAN DEPA	RIMENT
1 LOCATION OF WELL							UBLIC HEA	LTH
1	Township Name		fraction.	•		mber Town	Number	Range Number
Distance And Direction from Road	Hinkland		11/2:0	11 45 E 16	10		3 N/8.	7 E/W.
Distance And Direction from Road	ntersections	,	 	3 OWNER OF W	ELL-			·_\
•			1. is	Address		/ 		
	· · (•		
Street address & City of Well Local Locale with "X" in section belo	Sketch	Man:		4 WELL DEPTH	د مرا ف کا کا	-41	7	
				The sace bearing	45 11.		. Completion	`
				5 Cable to		Rotary	Drive	n Dug
				Hollow		Jensey (☐ 8010d	= -
" * 				6 USE: Dom		Public Sus		Industry
				ini.		Air Condi		Commercial
				7 CASING: The	eaded 🔀 1	Welded 📗	Height: Abo	ve/Below
ham I Mile				1			Surface	
: j2 FORMATIQI	N	THICKNESS OF	BOTTOM OF	<u></u> 17. 10			Weight 4	
		STRATUM	STRATUM	8 SCREEN:	n	. Depth	Drive Shoe	Yes No
6 6 1		21	21	1	٠,	. /		i
Den Sank		~/		Type: John	377	Dia.	: <u> </u>]
6. 11.		/=	33	Slot/Gauze _				·'
Gray Clay Gray Sard				Set between_	<u> </u>	and	n.	\succ
Gray Sord		12	45	9 STATIC WATE	K- Parl	ter.	•	ł
	,			9 STATIC WATE	A LEVEL			
·					ft. below la			
				10 PUMPING LE			-	
				30	ft, after 🔀	hrs. pumpi	~ <u>6</u>	2_ g.p.m.
	•							}
}				111 WATER QUA			<u>~</u>	9.p.m.
				tron (Fe)			•	1
i				1				
				Hardness _				
				12 WELL HEAD	COMPLETIC	In Die	Approved Pr	•
							" Above Gra	de
{		•		13 Well Grouter		_	_	1
				Neat Ce				
1				Depth: From 14 Nearest Soul	m	ft. lo	f1.	
							Section	Type
ţ !	RECEI	VFD	<u>.</u>	Well disinfed				
	RECE!	ublic Hea	!th	15 PUMP:		Not ins		
				Manufacture	r's Name _	レノミカイハ	r./	
-	MAR 2 8	1282		Model Numb	or		IP 1/2 Volte	230
	Bureau			Length of Di	00 Pipe	Y n. cape	city <u>15</u> G.	P.M.
	Bureau of Environ Occupational Hea	inental at	S	Type: 🔀 S				1
		GAA^)	>	د ⊡ ،	e 1	Rec	iprocating	
<u> </u>								ł
16 Remarks, elevation, source		L	17 WATER	WELL CONTRAC	TOP'S CE	BTIEICATI	ON:	<u>·</u>
deliberts, elevation, source (or uale, ElC.			WELL CONTINUE				S true
			to the be	est of my knowle	age and bel	iel.		_

100M (Rev. 12-68-

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GEOLOGICAL SURVEY COPY

1 LOCATION OF WELL						PUBLIC HEA	LTH
County	Township Name		Fraction		Section Number	Town Number	Range Number
Oakland	Highland	1	ж.	* ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	Section Number	3. N/S.	7 254
Distance And Direction from R	Ocation	.·		3 Owner Of Willand Hills Golf Course Address 2075 Oakland Dr. Box 509 Highland, Michigan 48031			
Locate with "X" in section	pelow St	ceich Map:				Date of Completio	n
				82	- • •	5-13-81	
▎┝╼ ┩ ╼╶╬╸╌╬				5 🗷 Cable to	ol Rota	ry Drive	n Du
				Hollow !		ed Borec	
╽┈┝╶╶┽╾╴┾╶╸╌ ┦╸╸┥┺┰	-			6 USE: Don	estic Publ	ic Supply	Industry
			•	D100	ation Air (Conditioning	Commercial
	14.			□ Tass		olf Course	_
<u> </u>	_			7 CASING: Th	readed Welder	Crate^t	axe/Balow
	- 			Diam.	_	Surface	ft.
500		THICKNESS	DEPTH TO	8	57 194 tt. Dept	Surface	351bs./n.
2 FORMA	TION	OF STRATUM	BOTTOM OF STRATUM	in. to	ft. Dept	h Drive Shoe	Yes No
				8 SCREEN:	Johnson St	h Drive Shoe	
Top Soil		1.	1'	Tunne	Steel	Dia.:8*	•
		1				Length	
Sandy Yellow Clay		6'	7'				
		- 	· · · · · · · · · · · · · · · · · · ·	1	55 9 M n. and 82	<u></u>	
Yellow Sand		2'	91	Fittings;	•		•
111111111111111111111111111111111111111				9 STATIC WATE	10 (5\/5)		
Hard Wellow Stony	C1	14'	231				
Hard lettow stony	CIRY	74	43	100	. below land su	rface .	
3							
Boulder			23'	_ _9/3	ft. after <u>B</u> hrs.	pumping27	<u>O</u> g.p.m.
			~~ 1	[
Bardpan W/some sto	nes	29'	52 '		ft, after hrs.	pumping	g.p.m.
				,	LITY in Parts Per		
Fine Dirty Water S	and	2'	54'	Iron (Fe)	3-1 Chia	rides (CI) <u>51</u>	
					0/0		
Clean water sand		28'	82 '	Hardness _	340Othe	<u> </u>	
						In Approved P	
Fine Putty Sand		1.	83'			12" Above Gr	ede
					d? 🗌 Yes 🗷 No		
				Neat C	ement Benton	··• □	
1				Depth: Fro			
				14 Nearest Sou	rce of possible c	ontamisation 1	nknown
					Directi	on	Typ
				4-2-	cted upon comple	tion 🔀 Yes 🗌 N	10
	0.1.			15 PUMP:		or installed	
				Manufacture		ed Jacket	
,	XX	<u>ጉ</u> ፈኬ		Model Numb	<u>500T5-191</u>	<u>4</u> нг <u>5</u> voit	, <u>460</u>
	/			Length of D	100 Pipe <u>52</u> h	. capacit250 G	.P.M.
	· · · · · · · · · · · · · · · · · · ·	T -		Type: 📆 5	iubmersible		
!	- 1 1081	\ *		1 =		Reciprocating	
	YUGIT 130	;]]		-	
USE A 200 BHEC	•	ا اذ ا					
16 Remarks, elevation, sou	rce of data, etc.	.57	17 WATER	WELL CONTRA	CTOR'S CERTIFI	CATION:	
	ILLY MY	<u> </u>				on and this report	is true
THEFU. BY DRILLER.		10/		est of my knowle D. Coresus	*	DOSE	
	11 =		REGI	O. COPERUL STERED BUSINESS	NAME	REGISTR	ATION NO.
SORRECTED BY	~			15101 1	11 M/14 P-	ad, Oak Pa	rk 48237
	.;∪; 		Address	1/11		977	
MONICCASE			•	11/1801	Willer	Wom Jul	v 29. 198
D67d 100M (Rev. 12-6			Signed_	AUTHORIZED REP	RESENTATIVE	naio nitt	3_47 ₄ _470
TOTAL TAKE 1 Z°C					and the second second		

	ACT 294	PA 196	is OF
1 LOCATION OF WELL Coupsy Township Name		Fraction	PUBLIC HEALTH
CAKLEND HIGHLAN	10	1 .	Section Number Town Number Range Number 15/L/N/S. /L /Ee/W.
Distance And Direction from Road InterSections	1.1.1		3 OWNER OF WELL: ATHNOR (RAFTHOMAS, INC.
			Addiess 119 PONNSULA DIE
Street address & City of Wall Location			Addiess 119 PONNSULA DIL HIGHAPINO, ADI 48031
Locate with "X" in section below	Skeich Map:	ئـــــ	4 WELL DEPTH: (completed) Date of Completion
	Will Ko		30 n. 6/15/34
·			5 Cable tool Rotary Oriven Oug
			Hallow rod Jeffed Bored
	*		6 USE: Domestic Public Supply Industry
			Irrigation Air Conditioning Commercial
	•	-	Test Welt
			7 CASING: Threaded Welded Height: Above/Below. Surface
hand Mile	THICKMESS	DEPTH TO	
2 · FORMATION	OF STRATUM	STRATUM	7 in. to 27ft. Depth Weight 1bs./ft.
` 			8 SCREEN:
BROWN SHUD	0	5	Type: 574 MIRST Dian / 1/4/
			Slot/Gauze / Length //
The worder Char	1/5	a C	Set between 2.7 ft. and 46 ft.
•	1 1		Fittings: ZPEINERLIKE
Gray ZAWN - GYA. EL	1/20	<u> </u>	
			9 STATIC WATER LEVEL
·			10 PUMPING LEVEL below land surface
			15 It. after / hrs. pumping / C g.p.m.
			11 WATER QUALITY in Parts Per Million:
			·
	3		tron (Fe) Chlorides (CI)
	1-1		Hardness Other
1	12 (4)		12 WELL HEAD COMPLETION: In Approved Pit
· · · · · · · · · · · · · · · · · · ·	:- 1		Tilless Adapter 412" Above Grade
į.			13 Well Grouted? Yes Ho
		· · · · · ·	Neat Cement Bentonite
\	≥ 1	•	Depth: From ft. to ft. 14 Nearest Source of possible contamination
	 		Coleet Spirection 35-DY: C Type
			Well disinfected upon completion Pres No
			15 PUMP: Not installed
	1 1	:	Manufacturer's Name F9 6
+		,	Model Number 27 - HP L Volts //
<u> </u>			Length of Drop Pipe 21 tt. capacity LG.P.M.
			Type: Submersible
DEACHTES			Reciprocating
RECEIVED	1		
use A 200 Mich. in Dash cof Public 16 Remarks, elevation, source of data, etc.		17 WATED	WELL CONTRACTOR'S CERTIFICATION:
MAR 1 1 1985	1	This wel	was drilled under my jurisdiction and this report is true
	1		st of my knowledge and belief.
Bureau of Environment	al and	REGIS	TERED BUSINESS NAME REGISTRATION NO.
Occupational Health - G	Swos	479 Address	FRICK LANG RD Highway, Mi
1	•		2/12/8
L	, ,	Signed _	J. 1 J. 1 Date (1) 1
D67d 100M (Rev. 12-68)	• • • • •		MOTHUMICED MEMHES PATALINE

		•	
	WATER V		·····O····O·····
1 LOCATION OF WELL	AL1 27	4 PA 190	S OF Public Health
County Township Name		Fraction	Section Number Town Number Range Number
CAKINEO MIKHION	0	101/20	White 10 TONNS. HIEEW.
Distance And Direction from Road Intersections	·		3 OWNER OF WELL: 11 M MILL CHAFT HELES, TAC.
i francis	-	. j	Address /19 PENNSILA 10
Street address & City of Well Location	- -		ALLAN SOND INVESTED
Locate with "X" in section below Sketch	Mep:		4 WELL DEPTH: (completed) Date of Completion
	10		40 1/15/85
		•	5 Cable tool Rotary Driven Dug
TEMESILA			6 USE: Bornestic Public Supply Industry
			D. USE:
 - - - - 			Tast Well
			7 CASING: Threaded Welded Height: Above/Below
	,		Diam. 2 Surfacen.
2 FORMATION	THICKNESS OF	DEPTH TO BOTTOM OF	37 in. to 40ft, Depth Weight _// lbs./ft.
	STRATUM	STRATUM	In. toft. Depth Drive Shoe? Yes No
Brown SAND		20	Type: STM. WESS Dia.: 1/4
			Stor/Gause 10 Leasth 7/7
BRUWN SAWD, GPAUE / (1+1)	20	29	Stat/Gauze 10 Length 3FF Set between 377 ft. and 40 ft. Fittings: Blama R. CHECK UNIVE
WHICK SHND , GRAVE		()	Finings: Blima R. CHECK UNIVE
april andity sindle	29	40	
			9 STATIC WATER LEVEL
			10 PUMPING LEVEL below land surface
			18 ft. after /2 hrs. pumping 10 s.p.m.
			19 h. stier hrs. pumping
			11 WATER QUALITY in Parts Per Million:
			Iran (Fe) Chlorides (CI)
			12 WELL HEAD COMPLETION: In Approved Pat
		l I	Pitless Adapter (212": Above Grade
- 1		-	
			Neat Cement Bentonite
			Depth: From ft. to ft. 14 Nearest Source of possible contamination
			60 feet 5 Direction 55-P4. C Type
	[Well disinfected upon completion Pres No
Mich. Dept of B			Manufacturer's Name Flints WAIIIICS
Mich. Dept. of Public Health	j		Model Number CPTUSS HP Volts 230
MAR 1 1 1985			Length of Drop Pipe 21 t. capacity 10 G.P.M.
			Type: Submersible Submersible Reciprocating Submersible Reciprocating Submersible Subme
Occupational Health			— — — — — — — — — — — — — — — — — — —
AND PASELLAL METERINGITH - CMOS	L		
16 Remarks, elevation, source of data, etc.		This wel	WELL CONTRACTOR'S CERTIFICATION: I was drilled under my jurisdiction and this report is true
		to the be	STERED BUSINESS NAME REGISTRATION NO.
		REGI	STERED BUSINESS MAME REGISTRATION NO.
		Address	4794 Deen Star HIGHLING 111747
		Signed_	PUZL DATE 1115/85
D67d 100M (Rev. 12-68)			AUTHORIZED REPRESENTATIVE

	* *		
·	WATER Y		and the best with the state of
1 LOCATION OF WELL	·		OF PUBLIC HEALTH
Couply Township Name	,	Fraction	Section Number Town Number Range Number W. 1 N/S. N/S
Service And Control of the Party of the Part			3 OWNER OF WELL AIHNOC CRAFT HONKS IN (.
/ Carried Direction from Hoad Intersections	- 3 - 3 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5	., –	
	_		Address 259 PENNELLA DA. HIGH HERD. M. 48031
Street address & City of Wolf Location		P	אלייין אייין אייין אייין אייין אייין אייין אייין
Locate with "X" in section below Ske	ich Map:		4 WELL DEPTH: (completed) Date of Completion
X 3			40 " (0/15/84)
	ずる		5 Cable tool Rotary Driven Dug
	•		Mollow rod Distrect Bored
*			6 USE: Domestic Public Supply Industry
miller	111		☐ Irrigation ☐ Air Conditioning ☐ Commercial
	•		Test Well
			7 CASING: Threaded Wolded Height: Above/Below
L MILE			Surfacett.
2 FORMATION	THICKNESS	DEPTH TO BOTTOM OF	2 in. to 3//ft, Depth Weight // lbs./ft.
	STRATUM	STRATUM	ft. Depth Drive Shoe? Yes No -
Do service	12	,	8 SCREEN:
BROWN SIAND			Type: Trihaicoustillals Dia : 1/4/
700		1 21-	Siot/Gauze 10 Length 36
BROWNSHINDA CLAY	- 1 5	25	Set between 37 ft. and 40 ft.
WATER SANDA EPHOOL	25	40	Fittings: PPEMERCHECK
			9 STATIC WATER LEVEL
, and the second		<u> </u>	10 PUMPING LEVEL below land surface
	i i	1	ft. after hrs. pumping
_ 			tt. after / hrs. pumping // g.p.m.
			16 11. after 2 hrs. pumping : / 2 g.p.m.
			11 WATER QUALITY in Parts Per Million; 11on 1Fe) Chlorides (CI)
		<u> </u>	
	. 1]	Hardness Other
	1		12 WELL HEAD COMPLETION: In Approved Pit
نمي ا	·) [Pilless Adapter 72" Above Grade
	/		13 Well Grouted? Yes No
\			Neat Cement Bentonite
			Depth: Fromft. toft. 14 Neares: Source of possible contamination
<i></i>			14 Nearest Source of possible contamination
			55 feet 5 Direction SCIA C Type
			Well disinfected upon completion 2 765 No.
			15 PUMP: Not installed
<u> </u>	· · · · · · · · · · · · · · · · · · ·		Manufacturer's Name
		}	Model NumberC/JOSS HP 2 Volts //
			Length of Drop Pipe 21_h. capacity 16 G.P.M.
			Type: Subpersible
	- 		Jet Reciprocating
חרמרויים	.	1	
USE A 2ND SHEET IF HEEDE RECEIVED	<u> </u>	17 WATER	WELL CONTRACTOR'S CERTIFICATION:
16 Remarks, elevation, sour alich dalephtos Publi	c Health	This wel	WELL CONTRACTOR'S CERTIFICATION: 1 was drilled under my jurisdiction and this report is true
MAR 1 1 198	ς .	19 the be	est of my knamledge and belief.
min/ + 1 130)	J	AEG!	STERED BUSINESS NAME REGISTRATION NO.
Bureau of Environmen	ntal med	47	94 THICK IN ZO WIGHLAND AT.
Occupational Haden	CWOC	Address	94 BUCKLK 20 HIGHLAND, 121, AUTHOR SEE REPRESENTIVE REGISTRATION NO. REGISTRATION NO. REGISTRATION NO. REGISTRATION NO. REGISTRATION NO. Daile LISTEY AUTHOR SEE REPRESENTIVE
Committee to the light to	21142		11/1 = /- 11/- KU
D67d 100M (Rev. 12-68)] >i0ued _	AUTHOR LED REPRESENTATIVE

TER WELL AND PUMP RECT TO -PERMIT NUMBER PART 127 ACT 368 PA 1978 LOCATION OF WELL E/M Distance And Direction From Fload intersection 3 OWNER OF WELL Address Address Same As Well Location? Yes No Street Address & City of Well Location Locate with 7 in Section Below WELL DEPTH (completed) Date of Completion 5-9-84 5 Cable tool Driven Rolary Mollow rod Auger _ Jetted 6 USE Comestic Type I Public Dirigation Type Ila Public Heat pump Test Well Type IIb Public . CASING Cores Chiesded Chiemeter Plastic Weided Height: Above/B 2 .n 10 3217 depth DEPTH TO SOTTOM OF STRATUM THICKNESS FORMATION DESCRIPTION OF STRATUM Grouted Drift Hole Diameter Dive Shoe - in to ___ □ No 10 10 32 it and _ FITTINGS K-Packer Lead Packer La Gramer Check Blank above screen _____ ft 9 STATIC WATER LEVEL 15 to below land surface 10 PUMPING LEVEL. below land surface , 20 It. after / hrs pumping at 10 GPM ___ ft. after _____ hrs. pumping at ____ 11 WELL HEAD COMPLETION Thiless adapter 2 above grade Basement offset Approved pit 12 WELL GROUTED? Bentonite -1UN 23 1984 No of begs of cement ____ 13 Nearest source of possible contamination Type Septe Osiance Soli Orection S Well disinfected upon completion? Thes : : No Pump Installation Only Length of Orop Pipe ___ It capacity ___ PRESSURE TANK USE A 2ND SHEET IF NEEDED Gallons 16. WATER WELL CONTRACTOR'S CERTIFICATION 15 Remarks, elevation, source of data, etc. AUDED INFO BY DRILLER, ITSM ML *CORRECTED BY " ADDITION BY ELEVATION DEPTH TO ROCK

D67a

.Rev 10 801

		WATER N				MICHIGAN DEPA	ARTMENT
1 LOCATION OF WELL		AC 1 2:	- / M 131	<u>. </u>		PUBLIC HEA	LTH
punty	Township Name		fraction	•	Section Number	P .	Range Number
Distance And Disection As and	14.5 AAR. 1.)		11/50			TINS.	175 E/V
Distance And Direction Is-		· · · · · · · · · · · · · · · · · · · 	7	3 OWNER OF			A3 ⁴ !
	-,ンサー・デースアー		-12	Address			So.
•	,	 > ;	·				_//
Street address & City of Well Loc Locate with "X" in section be	ation (1 1			· 		
- focate with X in section be	Sketc	h Map:	•			Date of Completio	•
	ا ا			170	n.		
	11/ 10%	32		Cable to		=	=
	1 Tai	P .	-	6 USE: Don			Industry
.	15/566/	†		Dirrie	=		Commercial
1 mi.	¹ /	•		Test	=) Commencial
	/		•	7 CASING: Th	resded Welde	d Height: Ab	ove/Below
				Diam.	_	Surface	n.
2 FORMATIO	NC	THICKMESS	DEPTH TO	12/ in. to	Zh. Dep	th Weight	<u>⊹</u> lbs.∕tt.
		STRATUM	STRATUM		n. Dep	th Drive Shoe	7 Yes No
		-		8 SCREEN:	" - Size ()	Dia.:/ //	
271011-610	WE TER	<u>C.</u>	6				/
	. 1 /	6	15	Siot/Gauze _	<u> </u>	_ Length	
- J. W. S. & G. J. J. J.	r / C AP. /	10-	 	1	67 n. and_		
Louis Ch	K Ly	15	60	Fittings:	and the	pysh.	
		 	<u> </u>	9 STATIC WATE	R LEVEL		
1111 1 - SPAN	:110m23	60	70	10	ft. below land si	urtace	
		† 	·		EVEL below land		 -
`				<u> </u>	n, after <u>L</u> hrs.	pumping	g.p.m.
	191	1		-		·	_
			<u> </u>			pumping	6.p.m.
		, ,	À	1	LITY in Parts Per		
	- 12 ···	 	-41	Iron (Fe)	Chic	rides (CI)	
	日でけっ		1.7		Othe	•	
		1960. J.	-			n Approved P	
1	1/2 m	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		i in ein		12" Above Gr	
<u> </u>	122		7		d? Ves No		
	13.	1	/	1 —	ment Bento		
		アンン		Depth: Fro	m fi.	10ft.	
				14 Nearest Sou	ce of possible c	ontamination 🔧	
				1		ion <u> </u>	
	INE WEST	 	· · · · · · · · · · · · · · · · · · ·	Well disinfer		etion 2 ves N	
	ECHIVED	}		1	_	Not installed	
A Company of Phone		 		1	r's Name		
	 1 7 1883					HP Volt	
		 		Type: S		t. capacityG	er . M.,
Detter to a	[_	Reciprocating	
				, ,	[
USE A 2ND SMEET I	F MEEDED						·
16 Remarks, elevation, source	of data, etc.				TOR'S CERTIF		
1			This well	I was diffed und	ser my jurisdiction and belief.	on and this report	is true
1	,			٠. ٠. ٠.	وممنو (ا ت :	REGISTRA	j 4 ,
			1				
			Address	·····	Star fre	1. 1. 1º	. , , ,
1				المتمر السمنوا	والمترسي	Date	•
			.Siphed			Date	

100M (Rev. 12-68)

1 LOCATION OF WELL					·	PUBLICHEA	LTH
County	Township Name	٠	Fraction	,	Section Number	I .	Range Number
My fland	the oflan		n'141 % «	4.16 · 16	12	-3 N/S.	7 E/W.
Distance And Direction from Ros	ad_Intersections		_	3 OWNER OF	WELL:		
				Address	··		
<u> </u>					<u>-</u> -		
Locate with "X" in section b				A WELL DERT	1: (completed)		
	288101	i Web:					
				<u> </u>		1-5	
				5 Cable to		= -	= '
• 				6 USE: Do			Industry
					=		Commercial
	•	•			• =	Constituting [] Commercial
					weeded Welder	Height: Ab	ove/Below
1 MILE				II DIAM.	2 /-	Surface	
	1001	THICKNESS	DEPTH TO	10. 10		1	
FORMAT	IUN	STRATUM	STRATUM	ın. 10	ft. Dept	n Drive Shoe	7 Yes 入 No 🗌
			_	8 SCREEN:	/		
John Star	- i-time	21	= /	Type: 377	11. Dept	Dia.:	4
	7	ا ر ا	27	Siot/Gauze	11.	Length	1. 10
May 120 219	1200/15 unla	16	5/	Set between	<u>4/</u> ft. and _	U4 n.	ł
	In Burn		44	Fittings:	200-02 1	1.1.	7 /
-18. 21 July 21	1 110 2 1454		7.7	9 STATIC WAT	ER I EVEL	7-20. 7-	
			ı	1	ft. below land su	daca	
					EVEL below land		
				15	ft. after 😤 hrs.	pumping	p.p.m.
	-			1			
	·				ft. after hrs.		9.p.m.
	•	1			ALITY in Parts Per		
				Iron (Fe) _	Chio	rides (CI)	
	(0.11.7)	!	•		Othe		·
<u> </u>	(1) (1)	135		12 WELL HEAD	COMPLETION:	O in Approved 5	
	/r			1	itless Adapter	==	
	/ :	/3			ed? Yes No		
	l isax		<u> </u>	No at C	ement Benton	🗆	
	-	5. [0		Death: Fre	omft.	non.	
		1	<u> </u>		urce of possible c		_
	· · · ·	1 /5./			Cted upon comple		
				15 PUMP:			10
Minh. Dept. of Public	Profit Land				 こっ つご	iot installed	
10 ° C 7 1913		F	· · ·	Manufactur	er's Name beg#_1 = 5	مدور ک <u>لم دی</u>	
no V / Noos]		(gooth of f	Prop Pipe _//_ h	. capacity	.P.M.
Barenu or Envationier	· · · · · · · · · · · · · · · · · · ·			1 _	Submersible		
Coupational Harry	[••••					Aeciprocating	į
]		_	1
USE A 2ND SHEET		L		1		0.47:01:	
6 Remarks, elevation, source	ce of data, etc.				CTOR'S CERTIFI		is true
•			REGI	STERED BUSINES	edge and belief. 5 NAME	REGISTR	TION NO.
				4 2 - 1	71	مهند سنطاع	TION NO.
			Address				
			Signed	1,00 m	PRESENTATIVE	Date /	
DA7# 100M (Rev. 12-68			2.0.160	AUTHORIZED RE	PRESENTATIVE		

GEOLOGICAL SURVEY NO WER	WELL	AND PL	JMP REC	c) L	PERMIT P	UMBER	
I LOCATION OF WELL		Fraction		Section Number	Town Number	Tanan N	
Oakland Township Nemiand		DW.	se, ne.	12	3 N/SX	Aenge Ni	EXX
Distance And Direction From Road Intersection			3 OWNER OF	, a.e			
	•						
-			Address (}	
Street Address & City of Well Location			Address Sar	ma.wan.focare	on/	11.	
Locate with 'A' in Section Below Si	eich Map	,	4 WELL DEPTH		Date of Comple		
			95		10-6-		
			5 Cable too	=	=	님	Oug
┍ ┡╶╺ ┩╸ ┩╌			6 USE TOOM		<u>_</u>	Type III Pu	blic
			U tropa	luon 🔲 Type I		Heat pump	,
			7 CASING TO		 	<u> </u>	
			7 CASING Diameter	Steel Threed	ded Height: Abo	vo litica :	
2 FORMATION DESCRIPTION	THICKMESS OF	DEPTH TO	1		Weight 10		
2 . FORMATION DESCRIPTION	STRATUM	STRATUM		Hote Diameter	1	Z¥ yes	
Brown clay-blue clay		45		ft. depth	[Drive Shoe	☐ No	
	 		8 SCREEN.	fi_depth	Not b	nstalled	
Blue clay-sand	42	87	TypeJ(ohnson	Diameter3		
Med. sand & water	8	95	Slon EXX.	12	Length 48	*	
		75	Set between		Lead Packer	it. Browner Che	
			Blank abo	ove screen	tr. Other	L'nip	عاه
			9 STATIC WATE	A LEVEL	-		
	 	<u> </u>	20	It below land VEL: below land so		∐ Flo	~
	ł		1		pumping at6()	- [
					pumping at		
	<u> </u>		11 WELL HEAD COMPLETION	Basamen		ebove grade	'
			12 WELL GROUT	750)	Yes From		
~112	 		Near cem	neni 🔲 Bento	nite Other_		
(5)	Į		No of bags o	_	Additives		
	7/		13 Nearest source	ce of possible conta			- +
ļc .	<u> </u>		Type sept	tic Design	nce <u>55 H</u> Dire	etion NE	
- MAY 1 > 205	<u> </u>		Well disinfects	ra upan camplerian	, 🗷 Yes 🗌	No	
V- T	/			Not installed	Pump ins	tallation On	ν
Lines (2)			Manufacturer	s name Red	Jacket 1		
7,0111			Model numbe	1.2		ions	20
		-	Length of Dro	Submersible	It capacity		_ G P M
			PRESSURE TA	ANK	3 -		
RECEIV			Manufacturer Model numbe	WX203	Capacity		Gations
15 Remarks, elevation, source of data, etc.	litie Heel t	16 WATE		ACTOR'S CERTIFI			<u>. 0 = 110 / 15</u>
M47161	905		rll was drilled unde lest of my knowled		d this report is true		
Percentage			Pettig W	ell Drål	ling 04	13	
Витель по Ели годи Оссераненої пест	narth Eng Talvari	A ##====	REGISTERED BUSHN	ckson Bl	REGISTRATE	sburg	
	- GWQS	Address	Dor. 8		Ne Date 5-		
D67d 2/84	·_	l Signed .	Apriloniz	ED REPRESENTATIVE	•		
, ·	٠.		\mathbf{U}	Aut	therity: Act :	388 PA 197	/≅

Conviction of a violation of any provision is a

GEOLOGICAL SEPANT NO

D57d

NAL TE	R WELL AND PL	INAD DECO D
<u> </u>	H VVELE AND PL	PERMIT NUMBER
1 (O.AT Ch. OF WELL	1,412,00	Servior further Town further Fange Number
Owerland Highly	NE VI	SW.NW. 12 3 N/S 7 EW
The state of the s		e Switte of Will
1 2		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		-0240
Street Address & City of Week Location		Accress Same As Well Location? Thes No
Cocate with a Section Below		4 WELL DEPTH (completed) Date of Completion
		35 " : 11-10-83
		Foreiv □ Diven □ Dug
		Guich rod Auger Jetted
		6 USE Type II Public Type III Public
		Test Well Type IIb Public Hear pump
		7 CASING Diameter Disease Threaded Meight Above/Below
1 witt		Plastic Welded Surface / fr
2 FORMATION DESCRIPTION	THICKNESS ! DEPTH TO	2 10 32 in nepth 1 Weight 2 22 the th
	STRATUM STRATUM	The District Dr. Box Damerer Drug Spon The
$C \neq P \neq C$		" " " depin
- Set fate in	- 	8 SCREEN Not installed
Sand Marie	32 32	Type 55 Diameter 14
		Sic: Ge Length 3,
		3 2_ h and 32 h
f_{\bullet}	2 25	FITINGS LI & Packer Lead Packer Bremer Check
- Walley Grind		9 STATIC WATER LEVEL
·	· · · · · · · · · · · · · · · · · · ·	15 to below land surface Flow
		10 PUMPING LEVEL below land surface
		30 It after 1 hrs pumping at 12 SPM
•		ft_after hrs_pumping at GPM
		11 WELL HEAD Thess adapter 12' above grade
		Basement affset Approved p.:
		12 WELL GROUTED? No Yes from to to
	1	
		full of case of cement Additives
	·	13 Necrest source of possible corramination
·	<u> </u>	Septie our 50 our N
		We are riested upon completion to the total the
BA: LE	RECEIVED	12 2 W Pump myta at the Only
MICN.	Dept. of Public Health	Manufacturers name
	MAR 2 C 1984	Model number \$050 HP 1/2 Voils 1/2
		Length of Groc Pipe 2/ ft capacity G P 1/
Bureau	of Environmental and	1977 Submentitus
Uccupa	itional Hearth GWQS	Marutacturers name well x True
USE A 2MD SHEET H MEEDED		Model number 201 Capacity Gallon
15 Remarks elevation source of data etc		WELL CONTRACTOR'S CERTIFICATION
UU INFO BY DRILLER, ITEM NO.		R was diffed under my jurisdiction and this report is true es) of my knowledge and belief
TOURECTED BY	Teak	Ke water Wall Dailling 63-124
"ADDITION BY	, , , , , , , , , , , , , , , , , , , 	REGISTERED BUSINESS NAME REGISTRATION NO
'E ION	Address .	3610 w. Mondon On Occasion
** *** *** *** *** *** *** *** *** ***		Authorized Meneschiathe J Date 2 -12 -84
Fry 10:90		-0 - nombed met medeminister

		WELL REG	ar a second and a second a second and a second and a second and a second and a second and a second and a second and a second and a second and a second a second and a second and a second and a second and a second and a second and a second and a second and a second and a second a second and a second and a second and a second and a second and a
1 LOCATION OF WELL	ACT 25	- PA 19t	OF PUBLIC HEALTH
Count. Complie Name		Frie tion	
Chicaid Kross		\$1-1:30	1E:521. 16 3 No 7 EL
tion town Board letel sections	: //	_ 	3 ONINER OF WELL
¹ *			
			Address
Street address & City of Well Location			
Locate with "A" in section below Sket	ich Map:		4 WELL DEPTH: (completed) Date of Completion
			12 11. 9-18-79
f			5 Cable tool Ratary Driven Due
			Hollow rod Jetted Bored
* - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - 			6 USE: Domestic Public Supply Industry
			Irrigation Air Conditioning Commercial
			Test Well
			7 CASING: Threaded Weided Height: Above/Below Diam.
ham twice and	THICKNESS		Surfacefi.
2 FORMATION	OF	BUTTOM OF	in to Zeett Vesti Weight institu
	STRATUM	STRATUM	in, toft. Death Drive Shoe? Yes No
BOWN SAND	15/	2/	5 5 1/1
	 2 /	3/	Type: S S Dia.: 4
FLOW VS-NOY CLAY	16	37	Slot/Gauze Length
	7 9		Set between (a) ft. andft.
ELOUN SAND STRAKS Blu Ch	7 8	45	Fittings: K. PACHOR
	7		9 STATIC WATER LEVEL
CKRY SKND FINE	1/6	61	26 ft. below land surface
1 2	1		10 PUMPING LEVEL below land surface
GIA, SHND		122	55 h. after Zirs. purroing // 0.0.m.
		,	
· · · · · · · · · · · · · · · · · · ·			It. after hrs. pumping g.p.m.
	{		11 WATER QUALITY IN Parts Per Million:
		Ĺ	tron (Fe) Chlorides (CI)
		ĺ	·
			HardnessOther
·	}		12 WELL HE TO COMPLETION: In Approved Pit
· · · · · · · · · · · · · · · · · · ·	 		Pitless Adapter 12" Above Grade
	1		13 Well Grouted? Tyes No Neal Cement Benicolte
	+		
	1		Depth: From 11. 10 11. 14 Nearest Source of possible contamination
	+		• 4
			Type
<u> </u>			15 PUMP: Not installed
	1		Manufacturer's Name Model Number HP/2 Volts 230 Length of Drop Pipe 511. capacity // G.P.M.
-	 		Model Number HP/2 Volts 230
	_l _	L	Length of Prop Pipe 5 ft. capacity / G.P.M.
			Type. X Submersible
			Jet Reciprocating
USE A 2HD SHEET IF NEEDED	<u> </u>	L	
16 Remarks, elevation, source of data, etc.			WELL CONTRACTOR'S CERTIFICATION:
PHYTE CUPD BY DRILLER, ITLE NO.		INIS WEI	ell was drilled under my jurisdiction and this report is true lest of my knowfedge and belief.
*CCTLC Br			STEREC SUSTRESS NAME REGISTRATION NO.
TRADUCTION BY		REGI:	ISIEREU DUSINESS NAME / REGISTRATION NO.
COEVATION		Address	SISTOUTION Y.F. SI
CIRLA LO BOOK		/	Date C -11-21
	<u> </u>	Signed_	AUTHOR DEC REPRESENTATIVE Date
D67a 100M (Rev., 50168)			

TER WELL AND PUMP RECOT PERMIT NUMBER PART 177 421 368 P.A. 1978 LOCATION OF WELL NE NW.NE. 3 N/5 1 HIGHLAND OAKIAND ! E/W CONTRACTOR Light Road it fercar C. SLEICH NAD · Section Below WELL DEFIN (completed) Locate with " Date of Completion 107 MAY 1983 Cathe tool Destate Diven Dug Hotton 100 Auge:] Jented 6 USE Domestic Tree Public Type III Public Test Well This a Public Heat Dump Type its Public 7 CASING Steel Threated Diameter Plastic XV-erded ☐ Threated Height Above. Surface ______ DEPTH TO BOTTOM OF STRATUM THICKNESS Weight ______ 174 15 FORMATION DESCRIPTION DF STRATUM Groutes Drivingle Diameter X ve. Dive Shoe Not installed - CAUEL (had Pax 103 FITTINGS KIPACHEL Lead Packer 🔲 Sremer Check 107 Siank above screen Othe: 9 STATIC WATER LEVEL Flow It below face surface 10 PUMPING LEVEL below land surface 40 It after 1 mi sumping at 15 GPM ___ ft_after _____ his pumping at _____ G P M 11 WELL HEAD COMPLETION Musiess apapter 217 above grade Basemer offset Acpioved pil 12 WELL GROUTED? 💢 Kic 🗔 Yek From _ ☐ Beriche ☐ Orner _ Theat cement 13 Nearest squite of post bie contamination sa Septic - So House Well disinterned upon completion **'Y**' '+-14 5 31.5 HF 1/2 VON 220 Well-X. Tro 202 Capacity Model number 15 Remarks elevation source of data WATER WELL CONTRACTOR'S CERTIFICATION This well was or lied under my jurisdiction and this report is true SOLD THEO BA DESTICE THEN HO MERCOTED BY PÉADDITION BY EURYTHON

767.5

Sev 10-80-

	1	, y ₀				
LOCATION OF WELL	WATER 1	WELL REC	ORD	De	IICHIGAN DEPA OF PUBLIC HEA	_
LOCATION OF WELL		from trum		Clion Number	Town Number	Range Number
CAKLAND HIGHLA	ND.	ڪ سکا	w.sw.	16	.3 N'9.	7 €/W.
ting of 4 mt S produced by the state of the		,	3-OWNER OF VEL	L:		
		,	Address	 -		
Pet address & City of Well Location						90
Lor are with A in socion below Ske	ich Map:		4 WELL DEPTH:		are of Completion	ı
	•		95		<u>9.22 -</u>	
 		!	5 Cable 1001		=	
├ -			6 USE: Domes		c Supply	Industry
					anditioning [
			Test W			
		,	7 CASING: Threa	deak Merded		1
	THICKNESS	DEPTH TO	4_in. 10	95 " Decu	Surface	ľ
FORMATION	STRATUM	STRATUM	in. ic	ft. Dept		Yes No
			B SCREEN: W/C	v		
ellow Sind	1-42	42	Type: John; S		Dia.:	2"
Brown Sund	18	60	-		7	
Stouth Jund		60	Set between <u>4</u> Fittings:	7 ft. and _5	ان الم	
The Water Sund	25	85		Tandan	1	
		01	9 STATIC WATER	LEVEL		
Francel, Brown - Grayish		96	78 H.	below land sur	face	
			_		umping -18	9.p.m.
		<u> </u>		after hrs. c		9.p.m.
	-		11 WATER QUALI			
			Iron Irei	Chlor	ides (CI)	
			Hardness	Other		
			12 WELL HEAD CO	-	_	
		•			12" Above Gra	ode
		1	13 Well Grouted?	Ye s No ent		
			Depth; From_		otı.	
······································			14 Nearest Source	of possible co	ntamination	
	1	}	75			Type
			15 PUMP:	d upon complet	on installed	
			Manufacturer's	Namped		
-			Model Number	12BC	H2 V0111	230-
			Length of Droc		capacity/5 C	.P.M.
			Type:X Sub	_) Osc	
	 		اه ر ن	L	Recipiocating	·
USE A 2ND SHEET IF REEDED						
Remarks, elevation, source of data, etc.			WELL CONTRACT			s true
		10 196 10	st of my A	e and belie!	17.	3,
		REGIS	TERED EVE SEES NO	J. Ing C	AEGISTRA	TION NO.
$\cup U$		Address	7215 N	1 11-5	<u>. </u>	Howell
			01 1-1	LI		
·		Sinned _	Thether	Aligha	Onie <u>/0 ·</u>	2-12

M-27 12 12 13		WATER \	WELL REC		الـالـا • ا	MICHIGAN DEPA	RTMENT
1 LOCATION OF WELL	<u>'</u>	AC1 23	Fraction	SW SWB		OF PUBLIC HEAD	LTH
Oak land	Highlan	d	Fraction	5 . N W.	Section Humber	3 NY.	Pange Number P E **
About	Inches Inde			3 OWNER OF V	til		
Sireer address & City of Well Loca	81.50	···-		Address		·	
Locate with "X" in section be	low Shelch	Map:		4 WELL DEPTH	_	Apr. 24	_
			:	5 Cable to	ol 🔲 Rota	Driver	D D vg
				6 USE: Dom	estic D Publ	C Supply	Industry
					Well		Commercial
1 MILE				Diam,	eaded Welde	Surface	
2 FORMATIC	:N	THICKHESS OF STRATUM	DEPTH TO BGTTOM OF STRATUM		56 tt. Dept		lbs. lft. res
Red Sand		50	50'	8 SCREEN:	son 5.5.		
Gay & Red	Sand Mix	10	60	8.	12 56 tt. and		
Water	r"			1 -		er (hec	k Val.
			-	9 STATIC WATE			
			-	10 PUMPING LE	VEL below land	surface	·
		ı			it. arter <u>-</u> nrs.	pumping	g.p.m.
					t. after hrs. : LITY in Parts Per		g.p.m.
<u> </u>				tron (Fe)	Chlo	rides (CI)	
				Hardness	Other	In Approved Pit	
				Pri		12" Above Gra	I.
· · · · · · · · · · · · · · · · · · ·				Nes: Ce	ment Benton		-
12°1	t			14 Mariasi Saut	ce of possible co	0012001021-00	
2.0ph.	λ					on <u>Siptic</u>	
Question portion				15 PUMP:		ot installed	
- Go Pari				Manufacture Model Numb	•*	HP Volts	
	, ,			Length of Dr Type: S	op PipeII	. capacity G.	Р. м .
				, C	_	Reciprocating	
use a 2nd sweet in			17 WATER V	VELL CONTRAC	TOR'S CERTIFIE	CATION:	
אַנ רפָה מַנָּה בּרָ	OFFICER, ITEM NO.		This well	was drilled und	er my jurisdictio	n and this report is	i true
***/	H.					Thing Co.	
ELEVITION SOUND						st. Pont	
D67d 100At (Rev. 12-68)			Signed	CHERY 1. 1	Vocilius;	Date 2 -	21-14

many the first of the control of the

·		S		* · ·	en en en en en en en en en en en en en e
	1/6	ACT 294	PA 1965		OF
LOCATION OF MELL	· "/		·	· ·	PUBLIC HEALTH
Orkland	T-p.	1	Fraction	Section No.	Yown Range
Tonce And Direction from Road	HighLn	~ (C)	ISE SL	(su 16	3 N/N 7 Ept
TORCE AND DIVERSON HOM KODE	THIS SECTION.	OWNER No		3 OWNER OF WELL	
<u> </u>				Address	
toor address & City of Well Loca	otion —				
4 FORMATI	ON	THICKHESS OF STRATUM	SEPTH TO BOTTOM OF STRATUM	4 WELL DEPTH: (complete:	f) Date of Completion 6-17-69
Dry Yellow Bar	nd	79	79	Hollow rod D	otory Driven Dug stred Bored D
Sand ' clay		6	85	6 USE: Domestic	
Sand - Clay	· · · · · · · · · · · · · · · · · · ·		65		Air Conditioning Commercial
Cley		6	91	7 CASING: Threeded W	alded Height: Above/Below
Coerse water sa	nd	7	98	fi. Do	Weight 11 Jbs/ft.
Fine water sond	1	5	103		apth Drive Shoe? Yes Me
12110 WE GOT BEING		 	100	8 SCREEN. Steinless	4 Å
Coarse water sa	end	7	110	l .	
				Slot Rouse 30	
<u> </u>		 		Ser between 106 ft. on	
?	~	_		Finings: Std. W/	Hurlap packer
				9 STATIC WATER LEVEL 	surface
				10 PUMPING LEVEL below	
	 				rs. pumping30a.p.m.
					rs. pumpingg.p.m.
·				II WATER QUALITY in Port	
	 			iren (Fe)C	hlorides (CI)
į.				Mardness	<u> </u>
				12 WELL HEAD COMPLETIC	
	 =		<u> </u>		12" Above Grade
				13 GROUTING: Well Grouted? The C	Kn.
	····			Material: Neat Comen	
				Depth: Fromft. to_	h.
				14 SANITARY:	
			<u> </u>	Nearest Source of passible	contomination setion_Cont1aType
	•			Well disinfected upon com	
				15 PUMP	
	 			Manufacturer's Name	
•				Model Number	HPG.P.M.
,				Type: Submersible	fr. capacityG.P.M.
] Jet	Reciprocating
) A Remarks, elevation, source of	data, etc.		This well	WELL CONTRACTOR'S CERT II was drilled under my jurisdic est of my knowledge and belief.	tion and this report is true
באוו ווויקליא.	. Pr DRIEGER LICH IN	ز	l .	lahn Camanan I S	

CORRECTED BY:

Address 100 mitter 11em Inv.

Address 100 mitter 11eld rd.

Signed Land Date L

70

100M

2		: bcT 14		WELL RE(294 PA 196		الل ال	AICHIGAN DEPA	7
l	1 LOCATION OF WELL :	Township Name		Fraction	1.1 56	Section Number	PUBLIC HEA	Range Number
	DAKLANA Distance And Direction from Rol	HIGHLAN		D ω _X /	JUL SEX	28	3 NA.	7 €/8.
l	S Locate with "X" in section b		to		Address	· · · · · · · · · · · · · · · · · · ·	Date of Completion	
•			, , , , , , , , , , , , , , , , , , ,		134			9
!	*				Cable to Hollow I G USE: Don Irrig Test 7 CASING: Th Diam,	nestic Publication Air (d Sored	Industry Commercial
Ţ	2 FORMAT	ION	THICKNES OF STRATUM	BOTTOM OF	4in. 10	1 <u>30</u> ft. Depti		
ı	SAND		30	30	8 SCREEN:	46.0.0	Die.: 4"	. Ass 5 Wes 1
ŀ	CLAY		95		Sion/Oware .	15 130 ft. and 1	Length	
	SANd		11	136		-PACK 1		
		-			9 STATIC WATE			
ı	······································			+		ft, below land sur EVEL below land :		
٠.		·				ft. afterhrs. s	oumping <u>30</u>	g.p.m.
1					·	ft. afterhrs. :	oumping	g.p.m.
7		·				LITY in Parts Per		
i			_	 	Iron (F8)	Chlor	ides (CI)	——— <u> </u>
Į				 	Hardness _			
			=1				In Approved Pi	
f		6)	7		13 Well Groute	d? Ves No		
í		B			Depth: Fra	m ft. 1	otı.	
. }		[4 .	198	1	60 _{1est}	WES Direction	SEPT,	c tank
		H OCT 1			Well disinfo		ion Yes N	
		1			15 PUMP:	r's Name Et	ot installed	
Ì	·	0.		†	Model Numb	<u> 2 س Ré</u>	HP 2 Valts	230
- }	 			 	Length of D	roo Pipe <u>#2</u> ft.	Capacity Co. G.	P.M.
		·			Type: [2] S		Reciprocating .	Ì
	USE A 2ND SHEET	17 MEEDED						
	16 Remarks, elevation, source	e of data, etc.		This woll to the be AIROS /	was drilled united to the state of my knowled to the state of the stat	Well Se	and this report i	584-
	◆CCRREC	TED IN SIV	· · · · · · · · · · · · · · · · · · ·	Address Signed 4	Donal	I Cin	Date Sep	PONTIACE 726, 81

			*	11	1 111	1111	1 11 1
	MAY 27 19	ORD IS		HICHIGAN DEP			
LOCATION OF WELL						PUBLIC HEA	
1	Township Name	1	15/115	ExSWx	Section Number	Town Number	Range Number
Onlitend	Highland		120%	3 OWNER OF	ZA VELL:	3 N∕€.	7 E/W.
J	7	3		J OHNER OF	<u>_</u> .		<u>}</u>
		7	7	Address	<u>{</u>		
roet address & City of Well Locat	ion		<u>ا</u>	·			
Locate with "X" in section beto	Sket	ch Map;		4 WELL DEPTH	l: (completed) [ete of Completio	٨
				94		12-23-80	
				5 🕝 Cable to	==	=	2
•				6 USE: Don		ic Supply	Industry
					=	Conditioning	
├				Test			
				7 CASING: Th	readed 😡 Welded	Height: Ab	ove/Below
1 MILE		THICKNESS	222211 22	}		Surface	
FORMATION	٧	OF	BOTTOM OF	•	90tr. Dept		
		STRATUM	STRATUM	B SCREEN: -	ft. Dept	h Drive Shoe	7 Yes 🕝 No 🗌
Hard Br Clay and ro	nlee	22	22	B SCREEN: JO	hnson		
TRAIL DI CLEY EIR FOR	-1-3	22	- 22	Type: <u>F/R</u>	12	_ Dia.:	
Brown Clay & Gravel		13 -	35		90_ft. and _		
<u> </u>				Eiminne.	<u>-</u>	_32, n.	
Br Cemented Sand &	Gezvel	35	60	5	tendard		
				9 STATIC WAT	ER LEVEL		
Gray Clay		12	72		ft. below land su EVEL below land		 -
Annual Press. Cand			70				
Cemented Brown Sand	C Gravel	6	78	- 69 -	ft. after _2 hrs. (-5- 0.p.m.
Fine to Fed. Gray W	nter Sand	16	94		ft. after hrs. (pumping	9.p.m.
124					ALITY in Parts Per		
				Iron (Fe)	Chlor	ides (CI)	
•]		٠	
· · ·	· · · · · · ·	 		Hardness _	COMPLETION:		
·	i					In Approved P	
/ c. · ;	15.	+			tless Adapter	12" Above Gr	5de
المنسلان				1	ement Benton	ite 🗍	
X	V			Depth: Fro			
1,7	<u> </u>			1	rce of possible co		.
13 KAY 2				75_feet	21	56.11.1	
	<u>, (())</u>	7		15 PUMP:	cted upon comple		10
		(1)		Manufacture	<u>ri</u> nd	ot installed	
	4/V/2 1100	27.7		Model Num		\ HP Velt	• 250
30%	135, 15	s		Length of D	- 	. capacityG	-
14.1	'0," C.	(8,2)	(12)	Type: 🕞	17		
·	مريح يرمي	-1		<u>~</u>	Jet [Reciprocating	
	HEEDED (M)GV	1/2					
6 Remarks, elevation, source of		· /3/2	17 WATER	WELL CONTRA	CTOR'S CERTIFI	CATION:	
AME INTO BY LESS		•	This wel	I was drilled un	der my jurisdictio		is true
CURRETTED BY 1	A Branch is				edge and belief.		
COMME "IED DI	1:00	_	— देख	STERED BUSINES	MANTO . INC.	REGISTR	ATION NO.
YE NOT JULE		•					· · · · · · · · · · · · · · · · · · ·
·· ADE TION BY			Address	!'puell			
/ 1			Address	<u>!'cuell</u>	n i		

JUL 1 0 1990	WATER V		
1 LOCATION OF WELL		Trans as	PUBLIC HEALTH
10 / Lini Highlan	<u>d</u>	Fraction	Section Number Town Number Range Number N. S. S. Z. N.S. T. E.W. 3 OWNER OF WELL:
DI DI COLONIA			Address .
Street addresk & City of Well Location			(- -
Locate with "X" in Acction below	1. 11.20		4 WELL DEPTH: (completed) Date of Completion
			5 Cable tool Rotary Driven Due
			Holloy rod Jetted Borod
			Domestic Public Supply Industry
			Test Well
Lames 1 MILE			7 CASING: Threaded Welded Height: Above/Below Diam. Surface
2 FORMATION	THICKNESS	DEPTH TO	2 in. to 102 ft. Depth Weight 122 16s./g.
' 	STRATUM	STRATUM	in. toft. Death Drive Shoo? Yes No
Yellow Sand Gravel	40	40	Type: STOIN/EGS Dia.
1/ve c/21/	30	20	Slot/Georg 12 Length 3 Set between 12 ft. and 110 ft.
Putty south	30	100	Finings: (KELI)" Nipple Plug
1 muse Sound	10	110	9 STATIC WATER LEVEL 20 ft, below land surface
		770	10 PUMPING LEVEL below land surface
	ļ		25 ft. after 1 hrs. gumping 30 g.p.m.
1			ft. after hrs. pumping g.p.m.
			11 WATER QUALITY in Parts Por Million;
,	 		tron (Fe) Chlorides (CI)
			HardnessOther
ilien.	•	ر، ،	12 WELL HEAD COMPLETION: In Approved Pit
/ 5 6		ţ.	Pittess Adepter 12" Above Grade
77 88			Neat Coment Bentonite
21-			Depth: From 11. to 11. 14 Nearest Source of possible contamination 7
4 2			58 feet W Direction 55716 Type
1117 3	/خ		Well disinfected upon completion (Yes No
6777110			15 PUMP: Not installed
1			Menufacturer's Name HP Volts
			Length of Drop Pipeft. capacityG.P.M.
			Type: Submersible
			Jet Reciprocating
USE A 2ND SHEET IF NEEDED			
16 Remarks, elevation, source of data, etc. 乳のに 'MA, マント エビ、アント MC			VELL CONTRACTOR'S CERTIFICATION:
GEOGREC'E.		to-the be	SVal my knowledge and belief.
SELEVATION IN		REGIS	TERES BUSINESS NAME REGISTRATION NO.
PERALUM BUCA	j	Address	Keego #21/04
,		Signed	71/1/2 Date 5/1/1/9

ATER WELL RECORD MICHIGAN DEPARTMENT OF PUBLIC HEALTH LOCATION OF WELL SE NE NSW X Section Num Range Number E/M. CAKLIND Distance And Direction from Road Intersections 3 OWNER OF WELL: Address Street address & City of Well Location
Locale with "X" in section below Sketch Map: 4 WELL DEPTH: (completed) Date of Completion h. 5 Cable tool Rotary Driven Dug Hollow rod 6 USE: Domestic Public Supply Industry ____ trrigation Air Conditioning Commercial Test Well 7 CASING: Thresded 🔀 Welded 🗌 Height: Above/Below Surface ______ft. 5/ It. Depth THICKNESS | Weight ______ lbs_/ft. **FORMATION** BOTTOM OF STRATUM in, to ft. Depth | Drive Shoe? Yes No [8 SCREEN: ه 3 3 O Type: _ Fittings: K-PALLEY 9 STATIC WATER LEVEL 55 30 It. below land surface 10 PUMPING LEVEL below land surface 40 ft. after 4 hrs. pumping 15 ft. after___ hrs. pumping 11 WATER QUALITY in Parts Per Million: tron (Fe) _____ Chlorides (CI) _ Hardness : Other 12 WELL HEAD COMPLETION: In Approved Pit Pitless Adapter 12" Above Grade 13 Well Grouted? 🗌 yes 🔀 No □ Neat Cement □ Bentonite □ Depth: From tt. to

14 Nearest Source of possible contamination 70 ten W Direction Ser/10 Wall disinfected upon completion Yes No 15 PUMP: Not installed Manufacturer's Name . Model Number 5548 _ HP 1/2 Volts 230 Length of Drop Pipe_40h. capacity_0G.P.M. Type: 🔀 Submersible ____ Jet Reciprocating USE A 2ND SHEET IF HEEDED 17 WATER WELL CONTRACTOR'S CERTIFICATION: 16 Remarks, elevation, source of data, etc. This well was drilled under my jurisdiction and this report is true ADDED INFO. BY DRILLER, ILLE No. to the best of my knowledge and balief.

REGISTERED BUSINESS NAME

D67d 100M (Rev. 12-68)

CORRECTED BY

TO HOLTIOR #15

	A STATE OF	i	
OCT 5 1972	WATER \	WELL REG	CORD MICHIGAN DEPARTMENT
1 LOCATION OF WELL County Odly and O Township Name		Frection	PUBLIC HEALTH Section Number Town Number Rence Number
County OAKLAND Township Name Distance And Direction from Road Intersections	ind		Section Number Town Number Range Number DW. SW. DE/W.
		• • • • • • • • • • • • • • • • • • •	Address
Street address & City of West Location / Control With "X" in section below Sketc	h Map:	٣	4 WELL DEPTH: (completed) Date of Completion
		•	104 n. april 19, 1972
 	٠		5 Cable tool Routy Driven Dug
│	•		6 USE: Promestic Public Supply Industry
	*	•	trrigation Air Conditioning Commercial
		,	7 CASING: Threaded Weided . Height: Above/Below
t witz ———			Olam. Surfacet.
2 FORMATION	THICKHESS	DEPTH TO	4 in. to 104 ft, Depth Weighttbs/ft.
- , , , , , , , , , , , , , , , , , , ,	STRATUM	STRATUM	4 in. to 194 ft. Depth Drive Shoe? Yes No
Dry Granel	0-80	80	Type: 45 55 Dia.: 4
of ellow Sand & grand	20	100	Slot/Gauze Length Set between / O.D. ft. and ft.
Wirty water Sand.	4	104	Fittings:
\mathcal{T}			9 STATIC WATER LEVEL 70 It. below land surface
			10 PUMPING LEVEL below land surface
	 -		70 ft. after# hrs. pumping 20 s.p.m.
			70 ft, after hrs. pumping 20 g.p.m.
			11 WATER QUALITY in Parts Per Million: Iron (Fe) Chlorides (CI)
			HardnessOther
	1		12 WELL HEAD COMPLETION: In Approved Pit
			Fitless Adapter 42" Above Grade
			Nest Coment Bentonite
			Depth: From ft. to ft.
			14 Nearest Source of possible contamination 5 feet 5. Direction Septic Type
			Well disinfected upon completion No
			15 PUMP: Dat installed
	<u> </u>		Manufacturer's Name Tlenty Highling Model Number HP Volta 1230 -
			Length of Drop Pipe 10 ft. capacity 5 G.P.M.
ě			Type: [4] Submersible
			☐ Jet ☐ Reciprocating
USE A 200 SHEET IF HEEDED			,
16 Remarks, elevation, source and dispetts U	7.	This well	NELL CONTRACTOR'S CERTIFICATION: I was drilled under my jurisdiction and this report is true gt of my knowledge, and belief.
ALLERA ME THE PROPERTY.	J. 1	2	enn + Sons. 0753
••ADDITION ET	1	REGI:	3355 Schalle BO Pinkne Mi
~			On Go II house
	<u>;_</u>	Signed _	AUTHORISED REPRESENTATIVE DATE CHARLES

NOV 30 1			
	WATER Y		
LOCATION OF WELL	-	Fraction	Section Number Town Number Range Number
Calcland i Highland	ŧ		N 4 BY 4 34 3 N/S. 7 E/W.
istance And Direction from Road Intersections			3 OWNER OF WELL:
	· _	•	Address
1			
Locale with "X" in section below Sketch	h Mao:	 -	4 WELL DEPTH: (completed) Date of Completion
			89 n. 3–81
			5 Cable tool Rotary Driven Due
			Hollow Ind Derred Bored
'F====================================			6 USE: Oomestic Public Supply Industry
			☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐
			7 CASING: Threaded X Welded Height: Above/Below
			Diam. Surface 20 tt.
FORMATION	THICKNESS	DEPTH TO BOTTOM OF	4-in. to 85-ft. Depth Weight 11 lbs./ft.
	STRATUM	STRATUM	B SCREEN: Johnson
Brown Clay & Gravel	4 =	4	Type: 8/8 W/W Dis.: 4"
	· · · · ·		Slot/Gause
Brown Clay & Rocks & Boulders	10	14_	Set between _pr_ ft. and _prft.
0	1	70	Finings: Standard
Grav Clay	16	30	9 STATIC WATER LEVEL
Brown Sand & Gravel	41	71	49 ft. below land surface
			10 PUMPING LEVEL below land surface
Gray Clay	9	80	75 ft. after 2 hrs. pumping 28 g.p.m.
Hed. to Coarse Gray Mater Gravel	9	89	ft. after hrs. pumping g.p.m.
124. to competent white traver	1 2		11 WATER QUALITY in Parts Per Million:
			Iron (Fe) Chlorides (CI)
(518)			-
/8:	15,		12 WELL HEAD COMPLETION: In Approved Pit
	(3)		Pitless Adapter 12" Above Grade
9- 400			13 Well Grouted? Yes No
NOV12 13	di :- ;;		Nest Coment Bemonite
			Depth: From 11. 10 11.
	1:5/		75 feet 11 Direction contto - Type
			Well disinfected upon completion
	1		15 PUMP: Not installed
	-		Manufacturer's Name <u>Trait</u> Model Number <u>HP_3/\$olts 230</u>
			tength of Drop Pipe 68 ft. capacity G.P.M.
			Type: 🔯 Submersible
	ļ		Jet Reciprocating
USE A 2ND SHEET IF NEEDED			
6 Remarks, elevation, source of data, etc.	1	17 WATER	NELL CONTRACTOR'S CERTIFICATION:
	TOW MIT		t was drilled under my jurisdiction and this report is true at of my knowledge and betief,
AUDED INFO. BY DRILLER.	- -	1425	Im William Co. The. 26
CORRECTED BYD A CA			
Commercial Co.		Address	lio cli
••ADDITION EE	نات الله	Signed	town & Brown

LOCATION OF WELL	_		PUBLIC HEALTH
Cakland Highlan	8	Frection SU JANIE	14 NULL 34 3 N/S. Range
And Discovery Board Index of the second	NER No.		3 OWNER OF WELL:
		/ .	Interlakes Mechanical Constructo
root address & City of Well Location		***	Wallod Lake, Michigan 48088
2 FORMATION	THICKHESS	DEPTH TO BOTTOM OF	4 WELL DEPTH: (completed) Date of Completion
	STRATUM	STRATUM	5
Sandy Yellow Clay	140	4.0	Hollow red Joned Bored
	1.00		6 USE: Domostic Public Supply Industry
Dry Yellow Sand	42*	46*	☐ Irrigation ☐ Air Conditioning ☐ Commercial
Coarse Water Eller Sand	5•	ณ•	7 CASING: Threeded Welded Height: Above/2005
,,			4_in. to 529_99t. Depth surface6_ft.
	 	 	Weight 11 bs/ft.
·			8 screen: Johnson Stainless
·	Ì	l	Type: Steel Die.: 4#
			Sion/GENEX 40 Longth 5°
			Set between 46 ft. and 574.
		<u> </u>	Firminge: 3" x 17" Ripple
		 	9 STATIC WATER LEVEL
			17_ft. below land surface
•		1	10 PUMPING LEVEL below land surface 30 ft. ofter 10 hrs. pumping 20 g.p.m.
			, , ,
	<u> </u>	l.	ft. afterhrs. pumpingg.p.a.
	ł	1	11 WATER QUALITY in Ports Por Million: 1ron (Fo) 0.3 Chlorides (CI) 34 -
			Hardness 221
	 	·	12 WELL HEAD COMPLETION: In Approved Pit
·			Pitless Adapter 12" Above Grade
			13 GROUTING: Well Grouted? Yes No
	 		Meterial: Nest Coment
			Depth: Fromft. taft.
			14 SAMITARY: UNKNOWN
· · · · · · · · · · · · · · · · · · ·	 		Neorest Source of possible contemination
			Well disinfected upon completion 🗗 Yes 🗌 No
••			15 PUMP: Monufecturer's Name Red Jacket
· · · · · · · · · · · · · · · · · · ·	 		Model Number R150NB_QCB HP 1 1/2
			Longth of Drop Pipe 35 h. capacit 243 G.P.M.
			Type: Submersible
6 Remerks, elevation, source of data, etc.	<u>.</u>	17 WATER	WELL CONTRACTOR'S CERTIFICATION:
			I was drilled under my jurisdiction and this report is true at of my knowledge and belief.
ADDED INTO, BY DRILLER, ITEM NO.			O. Corsaut Inc. 0025
CORRECTED BY:		ſ [~]	
• ADDITION BY:		. Address.	15101 W. 11 Mile Road, Dak Fark 4823
- Monthly Bi:		Signed	Dore April 22, 1969

367D

100M

6-6-6

1 LOCATION OF WELL	•			PUBLIC HEAL				ALTH	
County	Township Name		Fraction		Section Number	Town N	umber	Range (Number
Oakland	Highland		NW %	SDINK		3N	N/S.	7 <u>e</u>	E/W.
Distance And Direction from Road	intersections			3 OWNER_OF_N	VELL:				
	, hata-	$\overline{}$	- []	Addren	_		Γ		
		<u> </u>	H_{μ} .	£=					7
Street address & City of Locate with "X" in section be		Mag:	<u> </u>	4 WELL DEPTH	: (completed)	Date of C	ompletic	<u> </u>	<u>r</u>
		- 1						5	
sc				5 Cable to	el Aoi		☐ Driv		Dve
				Hollow			Dore		
*				S USE: Do		olic Suppl		Indust	
					_	Conditio	nine [Comm	•
					Well				
				Z CASING: TE	readed Weld			oove/Belo	
					6 7	¦ s		VPON	
2 FORMATIC	ON	THICKNESS	DEPTH TO BOTTOM OF	2	6 <u>3</u> 11. Dep	ith jw		75ibe	
		STRATUM	STRATUM	+ -/ Th. 10	68 tt. Der	th D	rive Shoc	7 Ye	yeo 🗌
			ما	8 SCREEN:					`
Sandy/Drift		36	36	Type: 836	x10 John	LEON:		1/14	
73 v. a. 63 am. 4		26	60	Slot/Gauze2	tainless	<u> Soot</u>	•1	itt.	
BINE CISA (ravel Lixed	70	62	Set between	63_ ft. and	<u> </u>	_h.		
Tater Sand	Char	6_	68	Fittings:	1/14 Cou	lpin	58		
MACEP Sain/	uray			9 STATIC WAT	ER LEVEL				
,		1		30	ft. below land s	urtace		1	
				1	EVEL below land				
					ft. after hrs.		15/2	LUS	.m.
				. 15	G.P.L. P	LUS	•		
					ft. after hrs.			9.0	.m.
					ALITY in Parts Pe				
	<u>, </u>	 	· · · ·	ron (Fe)	Chi	orides IC	ı)		
		[Hardness _	Oth				
				12 WELL HEAD	COMPLETION:				
			•		tiess Adapter				
					d? Yes N				
					ement Dento)		
T 78 3 4 6	1469			Depth: Fre		. 10	11.		
The District	Public Health	ļ		j14 Nearest Sot Bent1a →	Fear of	contamina 	tion		
	<u>h</u> 1983		ľ	50/8"	Rear of	"Work		 _	Type
MAY 1	7, 1200	/		15 PUMP:	cted upon compl			<u>No</u>	
5 5 17 nm	ental and			· - -	<u> </u>	Not insta	iled		
Occessor	nat Hastin	 		Manufactur		HP	1/-1		
Services Ad	!ministration	[Length of C	Prop Pipe				
			-,	1	Submersible		···········		
L				<u>ה</u>	•	Recip	rocating		
			68]		_ ,	•		
USE A 2ND SHEET !	* NECSEO								
16 Remarks, elevation, source	of data, etc.				CTOR'S CERTIF				
\				II was drilled un eat of my knowl	ider my jurisdicti idge and belief,	on and th	us report	is true	
ADDED INFO	BY DRILLER, LIEM HOL				ell Drill	ling_	16	27	
CORRECTED	BY. A STATE OF SE		_	STERED BUSINES			REGISTS	ATION NO.	
· · ADDITION			Address	3900 Sp		ray t	on		 _
ELEVATION	200				-ighijar	480	20 2	//10	63
DAZA 100M (Rev. 12-68)	OCK 35.35.3	<u></u>	Signed	AUTHORIZED RE	PRESENTATIVE	P•	ne		

MICHIGAN DEPARTMENT ACT 294 PA 1965 PUBLIC HEALTH LOCATION OF WELL Frection Section No. Range NEXNE & NUX 34 Highland stonce And Direction from Road Intersections 3 OWNER OF WELL: OWNER No. Address and and an Rd. reat address & City of Well Location THICKNESS DEPTH TO BOTTOM OF STRATUM 4 WELL DEPTH: (completed) Dent of Chaplefon FORMATION OF STRATUM 47 1. Apr11 17. 5 Cable teel Rotery ☐ Bored Hellow red Doned | Sand Q 6 USE: Domestic | Public Supply ☐ Irrigation ☐ Air Conditioning ☐ Commercial Clay Test Well 7 CASING: Threaded Welded Height: Abeve/Below Hard sand 2_in. 10 山場. Depth surface_____ Soft sand 38 Wolghes 75 Jbs/lt. Drive Shoot You No in. te أ Lt. Dopth Sand 47 8 SCREEN: Type: Mil To secured Slet/Gouze_10 443 h. and_ standard Fittinger 9 STATIC WATER LEVEL ____ft. bolow land surface 10 PUMPING LEVEL below land surface _____ft. ofter_1__hrs. pumping____20___ _h, efter__hrs. pumping_ .g.p.m. 11 WATER QUALITY in Ports Por Million: Iron (Fe)_____Chlorides (CI)__ Hardness___ 12 WELL HEAD COMPLETION: In Approved Pit Pitless Adapter 🔲 12" Above Grade 13 GROUTING: Well Grouted? 🔲 Yes 😡 Ne Meterial: Neet Coment Depths From____ft. to___ 14 SANITARY: Nearest Source of possible contamination 75 foot ____Direction septic tank Well disinfected upon completion Tyes No 15 PUMP: "vers Manufacturer's Name... Model Number HC 50 Longth of Drop Pipe 39 th, capacity 12 G.P.M. Type: Submersible **1**0 Jen Reciproceting 6 Remarks, slevation, source of data, etc. 17 WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my jurisdiction and this raport is true SHIEL INFO. BY SHILLER, ITEM NO. to the best of my knowledge and belief. From Drilling Co. · ... RECTED BY. . ADDITION BY 137-72 Dois AUTHORIZED REPRESENTATIVE

2670

1001

WATER WELL RECORD

1 LOCATION OF WELL			PUBLIC HEALTH
Oc. Share Township Name		Fraction	Section Number Town Mymber Range Number
Distance And Direction from Road Intersections	77	VIEXA	3 OWNED OF WELL
		·**	
The second second			Address
Locate with "X" in section below			7
3	ikatch Map:	- 1	4 WELL DEPTH: (Completed) Date of Completion
			5 Cable tool Rotery Driven Du
		Ver	Hollow rod Jeffed Bored
│ ╙ ┣╼╺┽╾╾╅╼╺╬═		E.	6 USE: Domestic Public Supply Industry
1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	-	TR	☐ Irrigation ☐ Air Conditioning ☐ Commercial
2011	3 1/	13	7 CASING: Threaded Welded Height: Above/Below
1 MILE		<i>_</i>	Diam. Surfacet.
2 FORMATION	THICKNESS	DEPTH TO BOTTOM OF	//_in. toft, Depth Weightlbs./ft.
· Tomation	STRATUM	STRATUM	in, to ft, Depth Drive Shoe? Yes No
Sa De clun	123	クス	B SCREEN:
			Slot/Gauze Length
De Seller S	37	50	Set between ft. and ft.
			Fittings;
	<u> </u>		9 STATIC WATER LEVEL
			20 1s, below land surface
		<u> </u>	10 PUMPING LEVEL below land surface
			ft. after hrs. pumping g.p.m.
			do attac
			ft. after hrs. pumping g.p.m. 11 WATER QUALITY in Parts Per Million:
			tron (Fe) Chlorides (CI)
بالنارق	2		HardnessOther
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/S/			Pitless Adapter 12" Above Grade
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7 OR			Depth: Fromft. 10ft.
7 Pr	Fiel		14 Nearest Source of possible contamplistion
N.			Well disinfected upon completion Diver Disc
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	<u> </u>		Manufacturer's Name
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USE A 2ND SHEET IF NEEDED	<u> </u>	· · · · · · · · · · · · · · · · · · ·	
16 Remarks, elevation, source of data, etc.	[WELL CONTRACTOR'S CERTIFICATION: I was drilled under my jurisdiction and this report is true
1 20 TO HIFU BY BRILLER HEM NU.			as of my knowledge and belief.
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ADDITION BY	~ T	Address	1154
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D67d 190M (Rev. 12-68)		Signed_	AUTOBILITO REPRESENTATIVE
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JUN - 3 1976 LOCATION OF WELL HIGHU	1015 29	WELL REC	i 5		_	N DEPARTA OF IC HEALTH	
I Township Name		Fraction		Section Num			-04 Numbe
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tence And Direction from Road Intersections	<u> </u>		3 OWNER OF W			N/ 3.	7 0
er lei		·	7	L		- -	
	O Va	Jelevi	1 Address	-		/:	
pet address & City of Well Location			Į.	/ <u></u>			
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	-						<u> 14-7</u>
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GRAY CIAY		26	0		dara	<u> </u>	
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(JRA-1 C/A-1 , TRAVEL	3	59		t, below land			
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	•	WAIEK V	M FT KEC		,	WICHIGAN DEPA OF	RTMENT
1 LOCATION OF WELL						PUBLIC HEA	LTH
	ownship Name		Fraction		Section Number	Town Number	Range Number
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Street address & City of Well Locati	on.	7				اا	
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And Trevel	W Please	1.3	95	50	ft, below land sur	lace	
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Occurational Ho. 189 - CV	****			ری			l
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16 Remarks, elevation, source of			17 WATER V	WELL CONTRAC	TOR'S CERTIFIC	CATION:	
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1			to the be	st of my knowled	nge and belief.	13/1/	اررجى
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I		. 1	Address			10. 10	777
	1		<u>.</u> . <u>.</u>	Fame!	2 Carres	Date	24-14
·			Signed	AUTHORIZED BERT	IF S C N T A T I N C	Date	

WATER WELL RECORD ACT 294 PA 1965

LOCATION OF WELL	- <u></u>	·		×	·	PUB	LIC HEALT	TH
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stence And Direction from Ros	d intersections	NER No		3 OWNER				
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reat address & City of Well La	totion —		/-	i		1		
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· I					∑} Submeraible □ Jet	_		
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etorrected by:	C.						AESISTAA	7104 MG.
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	·	4 Š	Signed	AUTHORIZED N	11. her Tyi	Coffee Date	-3 m = 1	-/4

D67d 100M (Rev. (12-68)

LON MATE , RELIEF BY DRILLER, ITEM NO.

TORRECTED BY
THAUDITION SY
ELEVATION
DEPIN TO ROCK

1 4 2 5

100M (Rev. 12-68)

17d

WATER WELL RECORD ACT 20 MCHICAN DEPARTMENT FURLIC MEALTH FURLI	13	J	°°.*		ــــــــــــــــــــــــــــــــــــــ	الحائدا ال			
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Street address & City of Wall Location Search Male:	Daylans	HIGHLAL	J ()	>W C	11) 45 5 4	360			
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Sinest edificats & City of Wall Location Control with 1	1	iler sections	<u> </u>		3 OWNER OF	VELL:	// 5:5:05.00.00		
Stream address & City of Walt Location Search Male:	İ	-		10-14-4	- Address		· .		
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Fittings: Standard Dead Static MATER LEVEL 12	UROWN C/AY	9 GRAVEL	30	30	Type:	UIW	_ Dia.:4	_	
Fittings: Standard Dead Static MATER LEVEL 12								/	
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10 PUNPING LEVEL below land surface					9 STATIC WAT	ER LEVEL			
10 PUNPING LEVEL below land surface					42	ft. below land su	rface		
This well was drilled under my jurisdiction and this report is true to be best of my knowledge and belief. This well was drilled under my jurisdiction and this report is true to be best of my knowledge and belief.									
This well was drilled under my jurisdiction and this report is true to be best of my knowledge and belief. This well was drilled under my jurisdiction and this report is true to be best of my knowledge and belief.					55	ft. after hrs.	ournaine 40	0.0.0	. 1
11 WATER QUALITY in Parts Per Million:									·
11 WATER QUALITY in Parts Per Million:		İ				to often her			
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HardnessOther 12 WELL HEAD COMPLETION:	i i								
12 WELL HEAD COMPLETION: In Approved Pit						Chio	ides (CI)		
12 WELL HEAD COMPLETION: In Approved Pit	•	,							
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13 Well Grouted? Ves No	•		٠.						ŀ
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Direction Septic Type Well disinfected upon completion Yes No					Depth: Fro	m ft.	101.		
Well disinfected upon completion	 							4	1
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Manufacturer's Name						cted upon comple	tion 🔀 Yes 🗌 N	lo	
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Model Number					Manufacture	er's Name <u>R</u>	en TAC	Ket	
Length of Drop Pipe 502 ft. capacity					Model Numb	m	HP / Volt	2 <i>3</i> (0
Type: Submersible Jet	· ·								
USE A 2MD SHEET IF MEEDED 16 Remarks, elevation, source of data, etc. ADDITIONALLY CRILLER, ITEM NO. ELECTRICAL BY REGISTERED BUSINESS NAME REGISTRATION NO. Address 2215 M-59 - Howell									1
16 Remarks, elevation, source of data, etc. ADDITIONAL OF CRILLER, ITEM NO. ADDITIONAL OF CRILLER, ITEM NO. ELECTRICAL BY REGISTERED BUSINESS NAME Address 2215 M-59 - Howell REGISTERED BY REGIST	I i					_	7 Reciprocation		
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Address 2215 M-59 - Howell	en orman BY			REGIS	STERED BUSINESS	HAME	REGISTR	ATION NO.	
endiation by	1						_	**	ļ
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100M (Rev. 12-68)

	WATER			,	AICHIGAN DEP	ARTMENT
1 LOCATION OF WELL	ACT 29	M PA 196	13		OF PUBLIC HE	ALTH
County / Township Name	1 1/	Fraction	5W	Section Number	Town Number	Range Number
()akland white	Lake	NEXA		7	3N N/S.	SE EVW.
Distance And Direction from Road Intersections			3 OWNER OF	VELL:	10110	/.
		7	Address	White		173.
			~~~~	3955 C	מנסיני אר	d Rd.
Street address & City of Well Location /			4 5555	Davis	ourg 1	21
Focus Action below 286	nch Map:		4 WELL DEPTH	i: (Compieted) (	Data of Compicili	on ,
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			5 Cable to	=		_ = _ [
w			6 USE: Dor			
			Dimi	=	ic Supply [	Industry
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2 FORMATION	OF STRATUM	STRATUM	in. to	fi. Depi		7 Yes 1 No 1
1			8 SCREEN:		· · · · · · · · · · · · · · · · · · ·	
Drown Sand & Graw	$\rho$	27	Types Joh	nson P.S.	_ Dia.:	3
Ra all		11.60	Slot/Gauze	10	Length	FT.
Alu May	27	48	Set between	76 tt. and _	<u>80</u> n.	
la de Calada de de	48	\ \ \ -	Fintings:	4/20 -	5.11 m	•
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ser is gener fund	00	1 0 -	10 PUMPING L	EVEL below land		
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			3=			
· •			<u> 55.</u>	ft. after hrs. (	oumping	0 g.p.m.
			11 WATER QUA	LITY in Parts Per	Million:	
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· 						
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IS-		hc — "	15 PUMP:		or installed	<i>,,</i> ,
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	1	j 31,	Model Num		HPVolu	
	_ <del> </del>			100 Pipe 103 h	. capacity <u>17</u> (	3.P.M.
「 と と と と と と と と と と と り に り に り に り に り	\ u.	/	. =	Submersible	<b>7 Basi</b> ssassissas	
	रीक्षा		l	Jet	Reciprocating	
USE A 2MD SMEET IF NECDED	1011				_	
16 Remarks, elevation, source of data, etc.				CTOR'S CERTIFI	-	
·				der my jurisdictio	n and this report	is true
•		21	Rose IV	el Due	\$17LG. 6	3-1749
	•	UREG!	STERES BUSINES	HAME	PESISTA	ATION NO.
		Address	4794	wek fa	Re LLG	1666 480
1			PM	>//	0	1 10
<u> </u>		Signed _	AUTHORIZED RE	pus_	Date	1/17/85

GEOCOGIC AC SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SUBJECT SU	1.			
		WATER \		
1 LOCATION OF WELL	·	~~.		PUBLIC HEALTH
Cakland	Township Name .Thite Lk.		Fraction ILE % I	N.2 % SE % 7 3 N.25. 8 EAN.
Distance And Direction from Road	Intersections			3 OWNER OF WELL:
	<b>-</b>			Address
Street address & City of Well Local Locale with "X" in section bel	tion		1	3
Locate with "X" in section bet	ow Sketc	h Map:	_	4 WELL DEPTH: (completed) Date of Completion
	•			84 n. 12-3-35
		•		5 Cable tool Rotary Driven Dug
*				6 USE: A Domestic Public Supply Industry
				☐ Irrigation ☐ Air Conditioning ☐ Commercial
		*		Test Well
				7 CASING: Threaded Welded Height: Above 3642
1 will	·····	THICKNESS	DEPTH TO	Surface 1 ft.  11-in. to 80 ft. Depth Weight 10-40s ft.
2 FORMATIO	N	STRATUM	STRATUM	in. toft. Depth   Drive Shoe? Yes \( \) No \( \)
				8 SCREEN:
Brown Gravel			79	Type: Johnson Dia:: 3** Stot 2006 12 Length 48**
Gray Sand Hater		5	84	
<u> </u>		1		Set between 80 ft. and 8/4 ft.
	· 		1	fittings: K-Packer l'Nipple
				9 STATIC WATER LEVEL
<b></b>				63 tt. below land surface
		+		70 ft. sttel 2 hrs. pumping 70 g.p.m.
			9	ft. ster hrs. pumping g.p.m.
	•	1	EI	Iron (Fe) Chlorides (CI)
		7 100cs	,10	
		5 1986 3	" <del> </del>	HardnessOther
	<i>j</i>		En/	12 WELL HEAD COMPLETION: In Approved Pit
	<u></u>	<del>                                     </del>		X Pitless Adapter X 12" Above Grade
		1-119		Nest Coment   Bentonite
, <del></del>				Depth: From tt. to tt.
<del></del>		ļ		14 Nearest Source of possible contemination
				75 feet <u>'''est Direction Septic</u> Type West disinfected upon completion X7 Yes □ No
				15 PUMP: Not installed
				Manufacturer's Name Red Jacket
	•	DE 25-		Model Number 17x203 HP2 Volts 220
	Llich	RECEIV		Length of Drop Pipe 53 tt. capacity 10 G.P.M.
		[		Type: ** Submersible   Reciprocating
		22101	E85	
16 Remarks, elevation, source		of Equipme	17.WATER	WELL CONTRACTOR'S CERTIFICATION:
	Occupa	tionel Hou	Ing mal	I was drilled under my jurisdiction and this report is true
•	•		Fett	was drilled under my jurisdiction and this report is true bast of my knowledge and belief. i.g. 'ell Drilling 0413
• i			REGI	STERED BUSINESS NAME REGISTRATION NO.
		• •		5575 Jackson slvd. Davisbur (,4301)
<u>.</u>		, in	Signed	Date 1-1-1

GEOLOGICAL SUHVEY NO	·		AND PL	JMP RECO' PERMIT NUMBER
LOCATION OF WELL County Oakland	Township Name White Lake	,	Fraction	SW 1/4 Se 1/4 Section Number 7 Town Number Range Number 3 N/S E/M
stance And Direction From Road	intersection			3 OWNER OF WELL
treat Address & City of Well Local Locale with "X" in Section Below	Sketch	Mag		Address Same As Well Location? Tyes No  WELL DEPTH (completed)   Date of Completion  82 ft. 1-14-85  Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Completion   Date of Compl
x				Mollow rod
2 FORMATION DES	CRIPTION	CKHESS OF RATUM	DEPTH TO BOTTOM OF STRATUM	# Plance TWelded   Surface 1 tt.   Weight 10 - 40 ps./ft.   Weight 10 - 40 ps./ft.   Drive Shoe 2 yes
brown gravel	rock		73	in 10ft depth   No
med. sand-grav	el-water 9	)	82	8 SCREEN:  Type Johnson Diameter 3in.
·				Sto St. 12 Length 48in.  Set between 78 tt. and 82 ft.
				FITTINGS. R. Facker Lead Packer Bremer Check R Blank above screen 1 t Other
				9 STATIC WATER LEVEL: 49 11. below land surface Plow
				10 PUMPING LEVEL: below land surface  63 It. efter 1 hrs. pumping at 60 G.P.M.
	Trule		·	
	5 (1)		:	11 WELL MEAD COMPLETION:  Basement difset Approved pit
- <del>\</del>				12 WELL GROUTED?
	35 30 7			No of bags of cement Additives  13 Nearest source of possible contamination
Ġ,	,			Type septic Distance 70 h Direction West
	FECE VEC			Well disinfected upon completion? Yes No
172	RECEIVED			Manufacturer's name Red Jacket
	17 JUN 7 1995			Model number HP 1/2 Volts 220 Length of Drop Pipe 63 It capacity 10 G.P.M
Fogs.	esa of Environmental and cursi one! Hoo'th - 50V-00	:	i	TYPE Submersible Jel PRESSURE TANK Menutacturer's name
USE A 2ND SHEET H	* #EE0E0		16 11:4 70-	Model number ====================================
15. Remarks, elevation, source o	or gara, etc.		This well	WELL CONTRACTOR'S CERTIFICATION:   was drilled under my jurisdiction and this report is true  stign  my knowledge and bekef.
			Pet Address	REGISTRATION NO.  5575 Jaclson Blvd. Davisburg

Section Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of th				
1 LOCATION OF WELL	_ 0 2 1982 '	WATER \		65 OF
1 LOCATION OF WELL	Towardin Name	<del></del>	Fraction	PUBLIC HEALTH Section Number   Town Number   Range Number
Oakland !	White Lake			Sit x Sit x 7 3 N/S. 8 E/W.
Distance And Direction from Road	1	,		3 OWNER OF WELL:
l gan green ingaanne on militarie				Address
Stract address & City of Well Local	ilan	•		' · · ·
Locate with "X" in section belo		Map:		4 WELL DEPTH: (completed) Date of Completion
				29 n. 11-22-80
<b>├</b> - <b>├</b> - <b>├</b> - <b>├</b> - <b>├</b>				5 Cable tool Rotary Driven Due
				Hollow rod Jetted Sored
		~		6 USE: Domestic Public Supply Industry
		•		Irripation   Air Conditioning   Commercial
				7 CASING: Threaded Welded Height: Above/Below
1 Mr.E				a Diam.
2 FORMATIO	·	THICKNESS OF	DEPTH TO DOTTOM OF	2 in, to 25 ft. Depth   Weight 375 lbs/ft.
		STRATUM	STRATUM	in. toft. Depth   Drive Shoe? Yes No 🔀
Set pipe in			·	Type: 99 Dia: 11
See Pope and				Siot/Guero 15 Length 32
Tap soil drove		25	25	Set between ft. and ft.
Water - gravel		4	29	Fittings:
<u></u>			<u> </u>	9 STATIC WATER LEVEL
			_	12 tt. below land surface
				10 PUMPING LEVEL below land surface
·	··			20 ft. after 2 hrs. pumping 15 g.p.m.
				ft. after hrs. pumping g.p.m.
				11 WATER QUALITY in Parts Per Million;
				tron (Fe) Chlorides (CI)
				12 WELL HEAD COMPLETION: In Approved Pit
				Pitless Adapter 12" Above Grade
····				13 Well Grouted? Yes No
				Nest Cement Bentonite
				Depth: From tt. to tt.
· · · · · · · · · · · · · · · · · · ·				50 feet nth Direction Eeptic
				Well disinfected upon completion Ves No
<del></del>				15 PUMP: Not installed
	<u> </u>			Manufacturer's Name
•	•			Model Number HP Volts
<del></del>				Length of Drop Pipeft. capecityG.P.M.
				Type: Submersible
			:	
S Pomeric elevation course			17 WATER	WELL CONTRACTOR'S CERTIFICATION.
6 Remarks, elevation, source of	· ·	,	This wel	WELL CONTRACTOR'S CERTIFICATION: Il was drilled under my jurisdiction and this report is true
PODED.	IKSO BY DRILLER, ITEM I	100	to the be Fett	is well Drilling 0413
פואטי ניסכא" • ניסכא" •	CTED BY	-	REGI	STERED BUSINESS NAME REGISTRATION NO.
ELETATIO	TEN BY	· . ·	Address	5575 Jackson Blvd. Davisburg
nc _r .			1	
			Signed _	Jerry L Fetty Date 12-4-80

LOCATION OF WELL		PART 127	ACT 368. P	
Dakland .	White Lal	ke	SE,	NW 1/4 SW 1/4 7 Town Number 3 N/3 Renge Number 8
Stance And Direction From Road In	l			3 OWNER OF WELL
				\(\frac{1}{2} \)
				Address
				-00/455
	'A.			
reet Address & City of Well Location	<u> </u>	Steich Map		Address Same As Well Location? Yes No  4 WELL DEPTH: (completed) Date of Completion
icate with X in Section below	•	STATEL MAD		29 h 10-8-81
	•			
				5 Cable tool Rotary Driven Dug
1x 1				Mollow rod Auger Jetted
				6 USE Domestic Type I Public Type III Public
				Type Ita Public Heat pump
				Test Well Type IID Public
				7 CASING Diameter Steel Threaded Height: Above/Below
		<del></del>		Plastic Welded   Surface ft
FORMATION DESC	CRIPTION	THICKNESS	DEPTH TO	2 in to 25% depth   Weight lbs./ft.
		STRATUM	STRATUM	in toh. depth Grouted Drift Hole Diemeter
Dmassa		<b>I</b> .	25	in to tt. depth   Drive Shoe   Yes
Drove			رء	in 10 ft depth
Med. Sand - Wate		4	29	8 SCREEN Not Installed
med. Sand - wate	:L	-	27	Type Johnson Diameter 14
		İ	İ	Slot/Guze 10 Length 42
· · · · · · · · · · · · · · · · · · ·				Set between 251 It and 29 It.
		į		FITTINGS: K-Packer Level Packer Ry Bigger Check
	· · · · · · · · · · · · · · · · · · ·			Blank above screenft. Other 2ft.
				9 STATIC WATER LEVEL.
		ţ	1	10 PUMPING LEVEL: below land surface
				10 ft. alter 2 hrs. pumping at 20 G.P.M
				It. after hrs_pumping at G.P.M.
	·			
•			<u> </u>	11 WELL HEAD Philess adapter 12" above grade
				Besement offset Approved pit
·				12 WELL GROUTED? No Yes From to
				Neat cement Bentonite Other
		ŀ	1	
<u>.</u>				No. of bags of cement Additives  13 Nearest source of possible contemnation
•				1
<u> </u>	<del></del>			Type septic Distance 60 ft. Direction N-B
•			ļ .	Well disinfected upon completion? Yes No
				14 8 9 9 6
				Not installed Pump Installation Only
			<u> </u>	Manufacturer's name
				Model number HP Volts
				Length of Drop Pipe ft_capacity G.P.I
			·	TYPE Submersible Jet
				PRESSURE TANK Manufacturer's name
	•			
USE A 2ND SHEET IF			16 1404 ==	Model number Capacity Gallo
5. Remarks, elevation, source of		Tu ac		R WELL CONTRACTOR'S CERTIFICATION: it) was drilled under my jurisdiction and this report is true
•	ed info by driller, iti			est of my knowledge and belief
	RACCTED BY		Pat	ttig's Well Drilling 0413
	DOITION BY			REGISTERED BUSINESS MAME REGISTRATION NO.
· · · · · · · · · · · · · · · · · · ·	ATION		Address	5575 Jackson Blvd. Davisb urg
6.7 f. =	N 70 8984			Jerry 7, the Pres. Date 10-29-81
0271			Signed	Date 40-67-01
d (Rev 10:80)			9	( ) AMMONITED HERMISENIALITY
				Authorized Replesentative
				1 Manuel reflecturing
	:			1 Manuel reflesions we

7 APR 2 9 1980			
	WATER Y		
I LOCATION OF WELL			PUBLIC HEALTH
County Township Name It	<del>-</del> .	Fraction SW X A	VWANWA Section Number Town Number Range Number Setw.
istance And Direction from Road Intersections	<u> </u>		3 OWNER OF WELL
-0.00	,	•	Address
reat address & City of Wall Location	·· ·· · · · · · · · · · · · · · · · ·	. 4	
Locats with "X" in section below Sketch	Map:		4 WELL DEPTH: (completed) Posts of Completion
			5 🔀 Cable tool 📗 Retary 📗 Driven 🔲 Due
<b> -</b>			Hollow rod Jened Bored
			6 USE: Domestic Public Supply Industry    Irrigation   Air Conditioning   Commercial
			Test Well
			7 CASING: Threaded Welded Height: Above/Below Diam.
	THICKNESS	DEPTH TO	in. toft. Depth   Weight lbs./ft.
FORMATION	STRATUM	STRATUM	in. to ft. Depth Orive Shoe? Yes No [
Sard Bravel	21	21	Type: Selver Stanker 4
1.114.11-1	16	32	Stol/GauzeLength
Sart Charef 5 clay	16	27	Set between 36 ft. and 12 ft.
Sard/ France / water			Solder Jul pipe
Bearing	5	42	9 STATIC WATER LEVEL  16 tt. below land surface
		7	10 PUMPING LEVEL below land surface
		·	
			ft. ofter hrs. pumping g.p.m.
			11 WATER QUALITY in Parts Per Million:
	<del> </del>		tron (Fe) Chlorides (C1)
			HardnessOther
•			12 WELL HEAD COMPLETION: In Approved Pit    In Approved Pit
1			13 Well Grounded? Yes No
<u> </u>			Neat Cement Bernonite
			Depth: From ft. to ft.  14 Neerest Source of possible contamination
			55 feet W Direction Septem Type
	<del> </del>		Well disinfected upon completion Yes No  15 PUMP: Not installed
ELLEY.			Manufacturer's Name
	Δ		Model Number 1182-9 HP 1 Volts 230 Length of Drop Pipe 21 ft. capacity 15 G.P.M.
7	H		Type: 2 Submersible
6 APR 21 1980 -	<del>  [] -</del>		Jet Reciprocating
ASE Y SHE PHEELD HEEDED	E		
16 Remarks, elevation, soorce of data, etc.	9/		WELL CONTRACTOR'S CERTIFICATION:
ADDED INFO BY DIMILER HELL			est of my knowledge and belief.
*CORRECTED BY		AEGI	STEREFUSINESS MARE QUESTRATION NO.
ELEVATION		Address	7174 1. Duck Le F.J. Highland
DEPTH TO ROCK		Signed /	Vary Belong Date 9-15-19

?			' المالللللللللللللللللللللللللللللللللل
FEB 8 1977	WATER	WELL REC	
1 LOCATION OF WELL	ACT 25	PA 196	PUBLIC HEALTH
Township Name	A	fraction	SectionsNumber Town Number Range Number
CAKLAUD WHITE LAK	E	Mus ?	3 OWNER OF WELLS
ristance and briegion from nose intersections			S DINNER OF WELL.
		-:	Address
treet address & City of Well/Lastich Locate with "X" in section below Sketc	<u> </u>		, , , , , , , , , , , , , , , , , , , ,
Locate with X in section below Sketch	h Map;		4 WELL DEPTH: (completed) Date of Completion  GU 16.
			5 Cable tool Rotary Driven Due
			Hollow rod   Jetted   Bored
°┡╶ <del>╺</del> ┪╾╾┿╼╶ <del>┦╸</del> ╴┥ <del>┖┱</del> ╸			6 USE: Domestic Public Supply Industry
			Irrigation Air Conditioning Commercial
			7 CASING: Threaded Welded Height: Above/Below
land 1 with and			Casing: Threaded Weided Height: Above/Below Surfaceft.
FORMATION	THICKNESS	DEPTH TO	ft. Depth Weightlbs./ft.
221	STRATUM	STRATUM	in, toft. Depth   Drive Shoe? Yes No
SAMIN & SEAUEL		6	8 SCREEN:
SAWD & SEAUEL	1.	_ري	Type:
Physic Chau	67	73	Set between 1 tr. and 60 tr.
21 01 16	101		Fittings:
BLUE CLAY & GRAVEL	10'	83	9 STATIC WATER LEVEL
(TRAVE)		90	30, ft. below land surface
			10 PUMPING LEVEL beign land surface
<u></u>	<b></b>	ļ	tt. after Zhes. pumping 30 g.p.m.
:		}	ft. after hrs. pumping p.p.m.
		<del>                                     </del>	11 WATER QUALITY in Parts Per Million:
01/191			Iron (Fe) Chlorides (CI)
191	<b>*</b>	l	
	<b>*</b>	<del>}</del>	12 WELL HEAD COMPLETION: In Approved Pit
	2.2	tal	Pitless Adapter 12" Above Grade
JAN 28	1311	7	13 Well Grouted? Yes No
	17tm/	ξV	Neat Cement Bentonite
ETZ: JAN 23	*	<b>V</b>	Depth: From ft. to ft.  14 Newest Source of possible contaction
13/5/5/	1	<b>/</b>	50 test W Direction Dortic Type
2 -115			Well disinfected upon completion Yes No
			15 PUMP: Not installed
	F		Manufacturer's Name  Model Number 5878 Hd 4 volts 230
••	1	_	Length of Drop Pipe 3 tr. cepacity (A G.P.M.
			Type: Submersible
			Jet Reciprocating
USE A 2ND SHEET IF NEEDED			
6 Remarks, elevation, source of data, etc.	<u> </u>	17 WATER	MELL CONTRACTOR'S CERTIFICATION:
ADUED INFO BY DRILLER, ITEM ML		This	I was drilled under my jurisdiction and this report is true
*CORRECTED BY			WHIS! STUS. OUSE
ADDITION BY		REGIS	6253 LEAMLANT (LAMESTE
ELEVATION A		Address	TO THINNING CAMINES
Character and and a		Signed _	X Ward. Dans 176
			BUTHORIZED REPRESENTATIVE

JUN - 3 1976	WATER N		CORD MICHIGAN DEPARTMENT OF PUBLIC HEALTH
County Township Name		Fraction	Section purbor Town Number Range Number
WHITE LA	RE	W.	SW: SW: S EM.  3 OWNER OF WELL:
			Address
Livet address & City of Well Location  Locate with "X" in section below Sketch			
Constant A in Person name Sketc	h Mep:		4 WELL DEPTH: (completed) Date of Completion
			Cable tool   Rotary   Driven   Dug   Hollow rad   Jetted   Bored
			☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐
			7 CASING: Threaded Welded Height: Above/Selow Surfaceft.
2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	in, tott. Depth Weighttbs./tin. tott. Depth   Orive Shoe7 Yes No
Gravel.		28'	B SCREEN: Type: Stat. Dia.: 44"
Grand & Dlue May	17'	451	Set between fall to and to
Shu Clay	34'	83'	Fittings: X-VACKER
Bhee Clay & Sand. Idee	7	90	9 STATIC WATER LEVEL  57  It. below land surface
Sand. (FINE)	7	97'	10 PUMPING LEVEL below land surface tt. after hrs. pumping g.p.m.
Shind. (CHOSE)		110	ft. after hrs. pumping g.p.m.
_			11 WATER QUALITY in Parts Per Million:  Iron (Fe) Chlorides (C1)
<u> </u>			12 WELL HEAD COMPLETION: In Approved Pit
			Pitless Adapter 12" Above Grade
			13 Well Grouted? Yes No
			Neat Cement   Bentonite
<u> </u>			Depth: From ht. to ht.  14 Near/st Source of possible contamination /
(v.116)	<del> </del>		50 feet Stratification DAPTIC Type
A VI			Well disinfected upon completion Yes No
			15 PUMP: Not installed  Manufacturer's Name FROM
E- MAY 26 1026		_	Model Number SBAS MP Zvolts 230
Control 1976			Type: 4 Submersible
USE A 2MD SHEEPTE MEEDED			Jet . Reciprocating
16 Remarks, elevation, source of data etc.		17 WATER	WELL CONTRACTOR'S CERTIFICATION:
ADDED INFO BY DRILLER.	, ITEM NO.	to the be	was drilled under my jurisdiction and this report is try st property and the second state of the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second sec
ELEVATION BY		Address	LOCALRAME (LADKETCH)
DEPTH TO ROCK 267d 100M (Rev. 12-68)	. 25	Signed _	AUTHORIZED REPRESENTATIVE Date \$/75

JUN - 3 1976 - \			
.5/0		WELL REG	
1 LOCATION OF WELL	ACT 2!	94 PA 196	OF PUBLIC HEALTH
Courty Township Name		Fraction	Section Number Town Number Range Number
	IKE	Nh) 42	WATED /Y 3 N/A. 8 EM.
Distance And Orrection from Road Intersections			3 OWNER OF WELL:
			Address CLARICSTUW BU, RE
street address & City of Well Located		76	4 Mich
	ch Map:		4 WELL DEPTH: (completed) Date of Completion
			45' n. 3/76
			5 Cable tool Rotary Driven Due
*			6 USE: Promestic Public Supply Industry
			USE: Commestic Public Supply Industry
			Test Well
' <del>                                    </del>			7 CASING: Threaded Welded Height: Above/Below
1 MILE	THICKNESS	DEPTH TO	Surfaceft.
2 FORMATION	OF STRATUM	BOTTOM OF STRATUM	in. toft, Depth Weightlbs./ft,in. toft. Depth   Drive Shoe? Yes No
			8 SCREEN:
STAVEL		18'	Type: 560+ Dia: 1/4"
01 1	31	5.1	Slot/Gauze Length
CLAVS GRAVEL	+ > _	di	Set betweenft, andft.
POHUE CLAY & SANIS	121	221	FORFAMER CHECK
1	-,	1-1	9 STATIC WATER LEVEL
BLUE CLAY	17	40	20 It. below land surface
516.	} *	مسار	10 PUMPING LEVEL below and surface
OHNIS GRAVEL		42	ft. efter
			fl. afterhrs. pumping g.p.m.
	1		11 WATER QUALITY in Parts Per Million:
	<del> </del>		Iron (Fe) Chlorides (CI)
	1		
	+		12 WELL HEAD COMPLETION: In Approved Pit
			Pitless Adapter 12" Above Grade
1.0,1			13 Well Grouted? Yes No
allui, c.	<del>                                      </del>		Neat Cement Bemonite
	V		Depth: Fromft. toft.  14 Nearest Source of possible contamination /
	<del></del>		50 feet 5 Direction BEDFIC Type
	E		Well disinlected upon completion Yes No
1976	1.		15 PUMP: Not installed
	<b>s</b>		Manufacturer's Name
	1		Model Number ( 6345 MP/2 Voits 132) - Length of Drop Pipe 51 ft. capacity ( G.P.M.
STIENS.			Type: Submersible
			Jet Reciprocating
•	1 .		
16 Remarks, elevation, source of data, etc.	ــــــــــــــــــــــــــــــــــــــ	17 WATER	VELL CONTRACTOR'S CERTIFICATION:
ADDED INFO BY DRILLER, ITEM	NO.	المع This	was drilled under my jurismation and this report is true
*CORRECTED BY		to the S	WARD + SOWS 0058
ADDITION BY		REGIS	
ELEVATION	. તુલું	Address	6253 CLAMLANE CHANKSTU
DEPTH TO BOCK	<b>65</b> 9	<b>6</b> 1==- =	X Ward 2/71
DA74 100M (Rev. 12-68)		Signed	AUTHORIZED REPRESENTATIVE . Date

D67d

100M (Rev. 12-68)

DEDLUCIUME SURFEE SAMPLE NO.	(,			
MA	IR 3 1 1981	WATER \	WELL REC	CORD MICHIGAN DEPARTMENT
1 LOCATION OF WELL	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	ACT 29	4 PA 196	OF PUBLIC HEALTH
"ounty Tow	inship Neme	Kc	Frection	Section Number Town Number Range Number
DISTANCE AND DISCOURS AND ACCOUNT			×//	W K NEW 19 3 NAS 8 EW.
				J OWNER OF MEETING
<u></u>				Address
Street address & City of Well Location Locate with "X" in section below		h Map:		4 WELL DEPTH: (completed) Date of Completion //-7-80
	Jasie			110 h.
X				5 Cable tool Retary Driven Dug
				Hollow rod Jetted Bored
				6 USE: Domestic Public Supply Industry
				Irripation   Air Conditioning   Commercial
				7 CASING: Threaded Welded Height: Above-Selew
	<del></del>	THICKNESS	GEPTH TO	1 Surface / ft.
2 FORMATION		OF STRATUM	BOTTOM OF	1 in. to 1. Depth   Weight 1 ibs/h. in. to 1. Depth   Drive Shoe? Yes   No
	<del></del>		-	8 SCREEN:
		30	7.	Type: Dia.:
1. 1. 2		30	30	Slot/Gent 12 Length 5
			7.02	Set between / ft. and // ft.
<u> </u>		1		Fittings: 1 Michigan 11 TOCANA
water Park		, ,	-	9 STATIC WATER LEVEL  Signature 1
			-	10 PUMPING LEVEL below land surface
	»	/3		ft. after / hrs. pumping g.p.m.
		1:	100	ft. after hrs. pumping g.p.m.
			<u> </u>	11 WATER QUALITY in Parts Per Million:
<del></del>				tron (Fe) Chlorides (C1)
				HardnessOther
		1		12 WELL HEAD COMPLETION: In Approved Pit
				Pitless Adapter 212" Above Grade
				13 Well Grouted?   Yes   No
		<u> </u>		Depth: Fromft.
	1.00.	<b>_</b>		14 Nearest Source of possible contamination
	Vanner.	K&		feetDirectionType Well disinfected upon completion \( \bigcap \) Yes \( \bigcap \) No
<del></del>	<del>/ ` · · · · · · · · · · · · · · · · · · </del>	1		15 PUMP: Not installed
	<del></del>	12		Manufacturer's Name
-: <u>.</u>	MAR 1319	B1 ====	]	Model Number HP Volts
	F1: 10 - "		<del>/</del>	Length of Drop Pipeft, capacityG.P.M.  Type: Submersible
		]		. Jet Reciprocating
16 Remarks, elevation, source of c	lata, etc.	1	17 WATER	WELL CONTRACTOR'S CERTIFICATION:
ACUED INFO BY DRI	LLER, LIEM NO.		This wel	It was drilled under my jurisdiction and this report is true
YB MANUSCOP	<i>j</i> • • • · · · · · · · · · · · · · · · · ·		1/2	
e - Adeition by Elevation				STERED BUSINESS NAME REGISTRATION NO.
ELC -		d	Address	
			Signed_	Date
D67d 100M (Rev. 12-68)			-	AUTHORIZED REPRESENTATIVE

LOCATION OF WELL	AUL ~ 8 T.	.; ,!PAHI 127		1978					
County Oakland	Township Name !!hite Lake		Fraction	SEW SHW		1	Range Number		
Distance And Direction from Road In		<del></del>	1411/4		well Highla	7 Ns	8 (2)		
					Goose	Meadow	CION		
				Address		. Highlar	nd .		
	-			1		Michigan			
Street Address & City of Well Locatio	n			Address Sa	me As Well Location	, 🖾 ves 🗀	No		
Locate with "X" in Section Below	SI	etch Map			H (completed)	Date of Completio			
				81		12-18	3-83		
<mark>┣╼╃╼╣╾╬╾═</mark> ┩				5 Cable loc		Driven	<b>□</b> 2₩9		
				Hollow 10		Jened			
				6 USE Dom			ype III Public		
<mark>▕</mark> ▐▗▃ <del>▗</del> ▃▗▐▗▀▃▗▋▋▀	•			☐ Irriga		_	leat pump		
				7 CASING Diameter			/Balaw		
				] . 🗆	Plastic 😡 Welded	Surface.			
2 FORMATION DESC	PIPTION	THICKNESS	DEPTH TO BOTTOM OF		77 th depth	Weight	— '' fbs /it.		
2 FORMATION DESC	TOR	STRATUM	STRATUM	Grouted Drill	ft, depth Hole Diameter		_		
Danier 0 3 0	- 3	1		m 10	It depth	Drive Shoe	K Yes		
Brown Sand - Grav	el		28	B SCREEN	t depth	<del></del>			
Plue Clay - Grave	1	-48	76		hnson o	Not Inst			
		<del>                                     </del>	<u> </u>		12 u				
Med. Sand - Water		5	81	,	n				
					K-Packer L				
<u></u>		ļ			ove screen fr	Other	·		
		j .		9 STATIC WATE					
				10 PUMPING LE	It below land s VEL: below land surf		☐ Row		
	·	1			t. after 11 hrs. p.				
				_	it. after hrs. p				
	(9) 117/			11 WELL HEAD COMPLETION	Pitless ada	=	-		
<del></del>	Charles of the second			12 WELL CROW	Basement (				
/3				12 WELL GROUTED? No 12 Yes From to tt.					
	AUG JO 1984 N	<del>[5]</del>		Neat cen	nent Benton	le 🔲 Oiher 🔔	<del></del>		
<u>1월</u>	·OG/	H		No of bags o	of coment A	dditives			
	190	Fiol		13 Nearest sour	ce of possible contain	whation	<u> </u>		
	, vy			TypeNo	ne Distanc	ett. Directi	on		
	<b>&gt;</b>	Vi/		Well disinfect	ed upon completion?	□ Yes □ (	No		
		7		14 9 149	Not installed	Pump Instal	<del></del>		
	-1170	1	· .	_	is name		INTERNATION UNIT		
						HP Vel			
<u>to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television to television t</u>	-		i		op Pipe				
C: mile make a				1 -	Submersible				
<del></del>		ļ		PRESSURE TA					
AND A SAME MANAGEMENT	ME I NE D				's name		Gano		
15 Remarks elevating Lagurage			16. WATE	Model number R WELL CONTRA	ACTOR'S CERTIFIC	Capacity ATION:	UB/10		
	<del></del>		This wa	ill was drilled unde	r my jurisdiction and				
• CORRECTED BY • • ADDITION BY				est of my knowled	•				
ELEVATION	•		-Fet	MECHATEMEN BUSIN	ll Drilli	AEGISTALTION	<del>3</del>		
OFFTH TO ROCK	4.				ckson Elv				
<del>-</del>	•		•		_		• •		
D67d    Rev 10-80			) Signed	AUTHOR	ED REPRESENTATIVE	. Date	<del></del>		
		•		ν Λ	1	-			

.

1 LOCATION OF WELL	<u>.</u>			PUBLIC HEALTH						
County	Township Name		Fraction	of sel	Section Number	Town Number	Range Number			
Oakland	White Lak	Ce es	rart	Of Se	19	3 N/E	8E/IK			
Distance And Direction-from Box				3 OWNER OF		7 1/2	JE IX			
	. 7		1	3 Danes or			¥:			
1 (	40110 A		•	Address	{					
•				1	ŗ		/			
Street address & City of Wolf Lo				<u> </u>						
Locale with "X" in section b	Sketc	h Map:				Date of Completion	•			
•	•		i	5	6 _{n.}					
h - d!l				5 🖫 Cable to	ol Aota	ry   Drive	<u> </u>			
		•	1	Cable tool   Rotary   Driven   Dup						
┃┉┟╶╺╛╾╴╅╶╶┷╴┤╩┯╴										
				6 USE: Domestic Public Supply Industry  Irrigation Air Conditioning Commercial						
·						Conditioning	Commercial			
11 ! ; ; ; } ;				Tes			······································			
<u> </u>				CASING: TH	roaded T Welder	Height: Abo				
land 1 wile and				1		Surface				
2 FORMAT	ION	THICKNESS	DEPTH TO BOTTOM OF	4 in. 10	_561. Dept	h   Weight	Ibs:/ft,			
T CHARACT		STRATUM	STRATUM	in. to	ft. Dept	h   Drive Shoel	Yes Mo			
				8 SCREEN: J	ohneon					
Clay		8	8	Tuest	s/s	on lin				
		† — — ·			B/ B	_ UIS.:				
Water Sand		12	20	Stot/Gause	-15	_Length				
					_51_ h. and _	<u>_56_</u> n.	1			
l Sanda Mar		5	25	Fittings:	Standard		}			
Sandy Clay		ļ <u> </u>	25	0.22.2.2						
			1.0	9 STATIC WAT	ER LEVEL					
Sand & Gravel		15	40		ft, below land su					
		1 -	٠		EVEL below land					
Fine Sand		9	49	35_	ft. after <u>3</u> hrs. (	oumping2	O 8.0.m.			
				1			1			
Water Sand		7	56	ft. after hrs. pumping g.p.m.						
	<del></del>	<del>                                     </del>			LITY in Parts Per		<del></del>			
1	•			fron (Fe) Chlorides (CI)						
<del></del>		<del> </del>					<del></del>			
}		j		<b></b>						
<b></b>	<del></del>	<b></b>	HardnessOther							
		·		12 WELL HEAD COMPLETION:   In Approved Pit						
<u> </u>						12" Above Gra	de			
•				· —	d? Yes No	<u></u>	{			
ļ				Neat C	oment 🔲 Benton	ite 🔟	<del></del>			
[				Depth: Fro						
	5. Ya				res of possible co					
•:	n. 3L			<u>75</u> (eet	Directi	_∞ Sept	10 Type			
	VEC 2	<u>{</u> }		Well disinfe	cted upon comple	tion Tyes N	• 1			
	OFC 29 1878			15 PUMP:		or installed				
· ·	3/8 2 /-	<u>[</u> /		Magniferen	_		1			
	<del></del>	<del>                                     </del>			r's NameAe		255			
	··	1				50 HP - 2 Volus				
	<del></del> - <del></del> - <del></del> - <del></del> - <del></del>	<b> </b>				capacityG.	P.M.			
l	1	1		Type: 💢	ubmersible		i			
	<b></b>			<u> </u>	<del> </del>	Reciprocating				
	)					j				
USE A 2HD SHEET		<u> </u>								
16 Remarks, elevation 50 112	e ologiata, etc.		17 WATER V	WELL CONTRA	CTOR'S CERTIFIC	CATION:				
1	•					n and this report i	s true			
*CORRECTED BY				st of my knowle	-	T	26			
ADDITION BY	4	•	REGIS	PERCO AUSTRICS	ling Co.	REGISTRA	TION NO.			
ELEVATION -C:	o ok						ļ			
DEPTH TO ROCK	### # 1		Address	Howe	L <del>1</del>	<del></del>				
			•				ł			
L			Signed	AUTHORIZED REP	arccutatius	Date				
						7				

### WATER WELL RECORD ACT 294 PA 1945

LOCATION OF WELL			SE-NY	1-NC		~	PUBLIC H	IEALTH			
Oakland	Milford		Fraction	4	19 19	Town	J _N M.	Renge	# E/B		
D tence And Direction from Res				3 OWNER OF WELL:							
5 rot address & City of Well Le  2 FORMA		THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	4 WELL D	EPTH: (comple		on of Con				
Clay		181	181	5 Cable tool Rotery Driven Du							
Sand Mix	ed with clay	101	281		Domestic C	Public Sond	upply ditioning	Indu			
Gravel m	ixed with clay	401	681	Tost Well							
Coarse s	and/clay	61	741	<u>Z</u> in. 1		Depth Depth	Weight		ft. Jbs/k. □w. <b>F</b> 70		
Sand, Med	./water bearing	9•	831	8 SCREEN				1+			
	•		 	Slet A	10		Longth	41			
<del></del>				Set betw Fittings:	2FT	14 ext	tensio	on 2			
			<del> </del>	9 STATIC	Breame WATER LEVE	L		TAG			
				10 PUMPIN	G LEVEL belo	w land surf	foce		4.0.0.		
					ft. efter	_hrs. pumj	ping		-9.p.m.		
		· -			QUALITY in P			<del></del>	<del></del>		
				Hardness	<b></b>						
<del> </del>			`	<b>Q</b>	12 WELL HEAD COMPLETION: In Approx Pitless Adapter 12" About 13 GROUTING: Well Grouted? Yes No						
1				Material:	Noat Com	ent 🔲_			··		
				Depth: 1	RY:		<del> </del>				
				_50_4	Source of possi	Septi		•			
				15 PUMP:	war's Name I	Rapida	yton				
			Model Nu Length o	f Drop Pipe_	<u> H2J-1</u>	3_HP_	G.P.M	 i.			
16 Romarks, elevation, source a	I data ata		17 WATER		Submersible  Jet  RACTOR'S CE		Reciprocat	ing			
t	THE BY DRILLER, 1914 BUL		This wel	ll was drilled	under my juris wledge and bali	diction and		ri is true			
• ARECTE	(1 C 100 0)		•	CEISTERED DO	Well Dri			33	N NO.		
0١٢١٥٥.خەم	N EDI		Address. Signeda	AUTHORIZED &	owley DI	The s					

GLOCO GLOCAL DOMEST COMMENTS	1			
	MAR 02 1952	WATER \	WELL REG	CORD MICHIGAN DEPARTMENT
1 LOCATION OF WELL	MAR OZ 1502	ACT 29	M PA 196	05 OF PUBLIC HEALTH
: DUCATION OF WELL	Township Name		Fraction	
Oakland	White Lake		NE W	SE NE NE N 30 3 25. 8 2
Distance And Direction from Rose		<del></del>	11.22 7.	3 OWNER OF WELL
l	<b>→</b>			C C
÷	· · · · · · · · · · · · · · · · · · ·			Address
Street address & City of Well Loc				
Locate with "X" in section be	slow Sketch	Mep:		4 WELL DEPTH: (completed) Date of Completion
				75 n. 12-20-80
▎┡╼╃╼ <del>╣</del> ╸╬╌┩				5 🔀 Cable tool 📗 Rotery 🔲 Driven 📗 Due
				Hollow rad Jetted Bored
"F				6 USE: Domestic Public Supply Industry
<del> </del>    <b>X</b>   ₁				Irrigation Air Conditioning Commercial
				7 CASING: Thresded Welded Height: Above/Selow
				CASING: Thresded Welded Height: Above/Below Diam.
		THICKHESS	DEPTH TO	7 4 in to 71 to Death Waishe the /h
2 FORMATI	ON	OF STRATUM	STRATUM	· · · · · · · · · · · · · · · · · · ·
				6 SCREEN:
Drove			70	Type: Johnson Dia.: 3"
Wad and	3			Slot/Game 15 Length 48"
Med. sand - (	coarse gravel			Set between <u>71</u> tt. and <u>75</u> tt.
water		5	75	Fittings: 1 ft nipple
#4 661			73	K-pack
<del>-</del>				9 STATIC WATER LEVEL
<del></del>				11. below land surface 10 PUNPING LEVEL below land surface
				48 tt. after 3 hrs. sumping 60 s.p.m.
				II. Sites ms. pumping g.p.m.
				ft. after hrs. pumping g.p.m.
	<del></del>			11 WATER QUALITY in Parts Per Million:
	\$			Iran (Fe) Chlorides (CI)
				HardnessOther
				12 WELL HEAD COMPLETION: In Approved Pit
	<del></del>			Pitless Adapter 12" Above Grade
• ·	·			13 Well Grouted? Yes No
<del></del>				Nest Cement Bentonite
				Depth: From ft. to ft.
				55 teet N Direction Septic Type
				Well disinfected upon completion Tyes No
······································				15 PUMP: Not installed
			٠	Manufacturer's Name F & W
· <del></del>				Model Number HP 2 Volts 230
				Length of Orop Pipe_50 h. capacity 10 G.P.M.
				Type: 🔀 Submersible
·				
				`
USE A 2HD BHEET I			17 WATER	MELL CONTRACTOR'S CERTISICATION.
16 Remarks, elevation, source				WELL CONTRACTOR'S CERTIFICATION: It was drilled under my jurisdiction and this report is true
ADDED	INFO BY DRILLER CLEN &	n.	to the be	est of my knowledge and belief.
	ECTED BY		T E C	tig "ell Drilling O413 ISTERED BUSINESS NAME REGISTRATION NO.
	PITION BY			5575 Jackson Blvd. Davisburg
ELEVAT			Address	A
**** *****	TO BOOK		Since	Jerry 1 Filly Dans 12-31-80
DC24 (Do., 12.59)			aigneo _	(AUTHORING ACPRESENTATIVE

MAR 0 2 1982	WATER Y	WELL RE	CORD		AICHIGAN DEPA	ARTMENT				
1 LOCATION OF WELL			PUBLIC HEALTH							
aunty Township Name		Fraction			Town Number	Range Num	ber			
Oakland White Lak	e	SE KN	ExSWx	30	3 (N/s.	8 /	₽w.			
Distance And Direction from Road Intersections			3 OWNER OF	ELJ:	ζ					
			Address			1				
·				(		. (				
Street eddress & City of Well Location  Locate with "X" in section below Sketc	h Map:	<del></del>	4	: (completed) C						
Stelle Stelle	n Mah:		74		-18 <del>9</del> 81					
			5 DA Cable to							
			Hollow P	_			Dug			
╵┍┝╶╌┩╌╌╃╌╶╀┸╌┩┺┰╴			6 USE: Don		ic Supply					
			Dirie	_		Commercia	el			
▎▕ <del>▗</del> ▀▜▀▀▜▀▀▜▀▀▋▓▀▘			Test	-						
· <u></u>			7 CASING: TH	readed Welded	Height: Ab	ove/Below				
- 1 MILE					Surface	h.				
2 FORMATION	THICKNESS	BOTTOM OF	4-in. to	70 ft. Depti			_			
	STRATUM	STRATUM	in. to	ft. Depti	Drive Shoe	No Kasa	Д			
Brown Clay - Gravel		14	8 SCREEN:	Tahmaan	. 28	1				
	}	<u> </u>		<u>Johnson</u>			——			
Blue Clay	15	29		10						
	-	<u> </u>		70 h. and _						
Brown Sand	39	68		nipple	•					
		-4	9 STATIC WATE	IN CEVEL	<del>_</del>	<del></del>				
Fine to Med. Sand - Water	6	74	25	ft. below land sur	face					
		<u> </u>		EVEL below land (						
·		ļ	_59	ft, sfter <u>2</u> hrs. p	umping30	g.p.m.				
		į	<u> </u>				•			
		ļ		h. after hrs. p		g.p.m.				
·	i		11 WATER QUALITY In Parts Per Million; Iron (Fe) Chlorides (CI)							
	<del>                                     </del>		1100 (74)	Chier	1065 (CI)					
,	}		Hardness	Other						
				COMPLETION:		it				
<u> </u>	<b> </b>		(X) Pit	less Adapter	12" Above Gr					
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1 LOCATION OF WELL :-							PU	BLIC HEA	LTH	
	Township Name		Frac	1100		Section Number	Town h	umber	Range	Number
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Distance And Direction from Road			<u> </u>	~~	3 OWNER OF		1-2	1103.		/ y w.
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1 LOCATION OF WELL	·					PUBLIC	C HEA		
County	Township Name		Fraction	Co Cc	Section Number	Town Num	ber	Range N	dumber
Oakland	White Lake		MCX	SCNSEN		3 1	N/IL	8	EPE
Distance And Direction from Ros	mi tum de serve e		4d)	3 OWNER OF	A-Z Contre 910 Parney	rorth		<b>L</b> 000 e	
Street address & City of Well Loc		h Map:		A WELL DEPT	Union Lake	Date of Com	(LE)	48085	
,				43	h.	11-23-		•	
X				5 A Cable to Hollow 6 USE: Dor	pol Rote rod Jen mestic Pub spation Air	Pry []	Bored	>	
		•		7 CASING: TI	weeded X Welde	d Heigl	ht: Abo	ve/8800	K
						Surfa	e• <u>2</u>	fr	
2 FORMATI	ON	THICKNESS	DEPTH TO		40_ft. Dep				
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Sand W/Stone					ohnson Sta				
	<del></del>	5°	_5•		teel				
Brown Sandy Clay		70	12•	Slot/CEEE		下。 Feudip 一		<u> </u>	
Sandy Clay		14.	261	Fittings:	3" x 17"				
			<u> </u>	9 STATIC WAT		- Mapped			
Stony Hardpan	•	10*	351	16	ft. below land su	rtece			
					EVEL below land				
Med Fine Sand		7°	43"		ft. after 4 hrs.	pumping	20_	O.P.	.m.
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	······································				ft. sfter hrs.			Q.p.	.m.
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	· · · · · · · · · · · · · · · · · · ·	<del></del>		Iron (Fe) _	Chic	rides (CI) _			
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					tless Adapter		ove Gra		
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}					trop Pipe 28 r		_		
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USE A ZHD SHEET		<u> </u>		<u> </u>		-, -			
16 Remarks, elevation, source					CTOR'S CERTIF		epart :	g 11110	
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D474 100W (Por 17.59)	1		Signed_	AUTHORIZED RE	PRESENTATIVE	Oated_	≖n•	740 4	714

1UN 11 1973 WATER WELL RECORD MICHIGAN DEPARTMENT OF PUBLIC HEALTH LOCATION OF WELL Fraction Section Number Town Number Range Number E/N. 3 OWNER OF WELL: Address . __ USS & City of Well Lockson Locale with "X" in section below Sketch Map: 5 🖫 Cable tool Rolary Dug Hollow rod Detted | 6 USE: Domestic Public Supply Industry 1rrigation Air Conditioning ☐ Commercial Test Well 7 CASING: Threaded Welded Height: Above/Below Surface _____ft. DEPTH TO BOTTOM OF STRATUM THICKNESS Weight _____ lbs./h. in. to 51_ft. Depth · FORMATION STRATUM | Drive Shoe? Yes No _in. 10 ft, Depth 8 SCREEN: 221 22* Type: Stainless Yellow Sand Dia.: Slos/Gauze #15 Set between 48 ft. and 51 ft. 271 Clay Fittings: 240 Packer Plux and coup. Yellow Water Sand 9 STATIC WATER LEVEL ft. below land surface 10 PUMPING LEVEL below land surface 25 B.D.M. 3o ft. after 2 hrs. pumping _ ft. ofter_ _ hrs. pumping _ 11 WATER QUALITY in Parts Per Million: fron (Fe) _____ Chlorides (C1) _ Other 12 WELL HEAD COMPLETION: | In Approved Pit Pitless Adapter 12" Above Grade 13 Well Grouted? Yes Tylo Neat Cement Bentonite Depth: From ft. to 14 Nearest Source of possible contamination 10 teet ____ Direction _ Well disinfected upon completion 🕞 YES 🔲 No. Not installed Manufacturer's Name Demoster
Model Number MODE HP 3 Volts 250 Dempster Length of Drop Pips ft. capacity 4 G.P.M. Type: Submersible ☐ Reciprocating USE A 2NO SHEET IF MEEDED 16 Remarks, elevation, source of data, etc. 17 WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. Drillers Log " Log John H. Roberts
REGISTERED BUSINESS NAME 0027 2838 Pleasant Walley-Brighton, Mich. David Roberts · 6/1.23-73 GRIZED REPRESENTATIVE 100M (Rev. 12-68)

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1 LOCATION OF WELL	ACT 23	M PA 191			PUBLIC HEA	LTH
County Township No	me	Fraction		Section Number	Town Number	Range Number
<u>Ualtland</u> i	lighland	<u> </u>	% %	23	TAN N/S.	1-7 E/W.
Distance And Direction from Road Intersections			3 OWNER OF	NELL:		
	Manua			artlett As:		
(			3	133 Union D	Lake koad	
Street address & City of Well Location			U	nion Lake.	liichican	
Focuse Autu X IN section pergm	>ketca map;	<del> </del>			Date of Completion	,
					18-34	
1 h-4-11	•		5 Cable to		ry 🔲 Drive	=
<b>"</b>			Hollow			
		•		nestic Publ	ic Supply Conditioning	· 1
1				=	Conditioning [	Commercial
• • • • • • • • • • • • • • • • • • • •					d Height: Abo	wa/Balau
1 Mile			Diam.		Surface	
	THICKNESS	DEPTH TO	in. 10	46ft. Dept	P .	_ ,
2 FORMATION	STRATUM	STRATUM	1		h Drive Shoel	
			8 SCREEN:			
Sand and gravel brown	201	201	Type:	Slot SS	Dia: 3 ^H	
					Length 43"	
Sand brown	151	351		46 ft. and 5		
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liuddy sand and gravel gre	y 10 °	451		coprene pad	lter	
	į.	ł	9 STATIC WAT	, -		7
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1			ļ	do adone has		
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					rides (CI)	
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			Hardness _	Othe	<b>.</b>	
·			12 WELL HEAD	COMPLETION:	n Approved Pi	t
1					12" Above Gra	
			13 Well Growte	od? Yes No		
<u> PECENTA</u>			Neat C	ement 🔲 Benton	ite 🗌 <u>cl</u>	y slurry
plich. Dept. of Public Usalib.	<b>8</b> 6/	111		<u> 0 ft.</u>		
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JUL 3 1 1954 (5%)	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			NH Directi	tion Kives IN	Туре
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recupations Harris Williams 101.53	384 = 1	٠, ج	Manufactur	Der 9BC	HP L Volte	
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ADDED INFO BY DRILLER, HAM NA				ider my jurisdictio edge and belief.	on and this report	\$ true
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P*ADDITION BY		REGI.	STERED BUSINES			ł
ELEVATION		Address	<u>2372 ) e</u>	kter Mord,	Aubum ili11	ls, ich
DEPTH TO ROCK			$\gamma$		6.9.	, ,
D67d 100M (Rev. 12-68)		Sign	ANTHORIZED RE	PACSENTATIVE.	······································	1

100M (Rev. 12-68)

1 LOCATION OF WELL						PUBLIC HEA	LTH
County	Township Name		Fraction		Section Number	Town Number	Range Number
OBKLAND	HIGHLANIA	<b>9</b>	MAS	W". NW.	16	3 (N)s.	7 (E) W.
Distance And Direction from Roa				3 OWNER OF	WELL:		, (5
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	7			Address			
Street address & City of Well Lor							
Louis with "X" in section h		Mao:		A WELL DERT	t: (completed) C	in a Completic	
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					11.	11-12-	70
<b>1</b>				5 Cable to		ry 📙 Drive	ი 🔲 ნოდ
				Hollow		d Bored	
*				6 USE: Do	nestic 🔲 Publi	ic Supply	Industry
				Dirrie	gation 🔲 Air C	Conditioning [	Commercial
				Test	Well 📗		
				7 CASING: TI	weeded Welded	Height: Abr	ve/Beign
				Diam.	•	Surface	
-		THICKNESS	DEPTH TO	1 4 10.10	64 tt. Depti		
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Y CLAY K	CRAVET	26	35	Slot/Gauze	14	. Length	
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G CLAY			00	9 STATIC WAT		, peo	
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		1			EVEL below land t		_
				50	tt. after Zhrs. s	jumping	2_ g.p.m.
				J		•	· ]
					ft. after hrs. p	umping	g.p.m.
				11 WATER QUA	ALITY in Parts Per	Million:	
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1				]			
1	10.			Hardness _	Other	<u>-</u>	
				12 WELL HEAD	COMPLETION:	In Approved Pi	1
	$\sim$ $\sim$			□   Pi	tless Adapter	12" Above Gri	ode [
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16 Parate stanting source		<u> </u>	17 WATER	MELL CONTRA	CTOR'S CERTISI	CATION	
16 Remarks, elevation, source		1			CTOR'S CERTIFIC		S TIUE
ADDED INFO BY DRILLER IT	tte ma		to the be	st of my knowle	idge and belief.	_	
*CORRECTED BY		-	_17/	2/6/11/0	HAME DRI	REGISTRA	8/
* ADDITION BY	/	İ	(Decar	STEREO BUSINESS	PHAME .		IIION NO.
ELEVATION			Address	28001	PLEOSAN	T ULF	·
DEPTH TO ROCK	.5	, .		0 .	10 6 15		
- WOCK	<i>:</i> 28		Signed (Spel	1. Kafer	D Date _//	-17-76
DA74 100M (Rev. 12-68)	· · · · · · · · · · · · · · · · · · ·		<u>-</u>	AUTHORIZEDAZI	RESENTATIVE	-	

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LOCATION OF WELL			\mathcal{A}	1 25	PUI	BLIC HE	ALTH V	<u> </u>
Cakland Highland		Fraction		Section No.	Town		Ronge	
tistance And Direction from Road Intersections		<u> </u>	3 OWNER	OF WELL	1_5_	N/\$.		E/M.
<u>jou</u>	HER No			J				ı
i de la companya de l		,		!			•	
treet address & City of Well Location	THICKNESS	DEPTH TO	AWELLD	EPTH: (comple		- (C	1.1	رز
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				WATER LEVEI	_			
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	,			h. efter	_hrs. pumping			.p.a.
			II WATER	QUALITY in Po	ers Per Millio	м:		
			Iron (Fe)		_Chlorides (C	:1)		— <u> </u>
			Hardness		-			
				EAD COMPLET	,			
			13 GROUTIN	Pitless Adept	ner 12º	Above	Grade_	
				rted? 🔲 Yes	⊉ №			·
	:			Nost Com			_ 	
			Depth: F	romft. to	<u></u>			 ·
	<u> </u>		Negrost S	iource of possil				=
1 10 0			<u> 75</u> 6		inectiosep			
elev. 1010 ±10 μελ- st. ω. el. 977 ±10			Well dising	nfected upon co	mpletion X_	Yes L	No	
st. w. el. 977				yrer's Nome	ed Jacl	cot_		<u>. </u>
		.]		mber7BB	£	_HP	_	
			·	Drop Pipei Submersible	2_#. capaci	142	_G,P.M.	
			<u> </u>	Jet	Reci	procetia	9	
6 Remarks, elevation, source of data, etc.				RACTOR'S CE			In America	
ADDED INFO. BY DRILLER, ITEM MA				under my jurisd rledge and belic		s report	IS TIVE	
ORRECTED BY		Pro	wn Dri	lling Co) . .	#E GI	26	
**ACCITION BY				Fichie				
		Signed	Z. fr. j	PR BOLLET	Date	0-1	68	

		AACTE !	MIND FO	JIVIT NECC) —	PERMIT NUMBER
1 LOCATION OF WELL	Township Name		Fraction	Section Number	Town Number Range Number
0akl a nd	Highland			NE SE 26	Town Number Range Number
Distance And Direction From Road In	itersection			3 OWNER OF WELL	Ġ,,
					7
	- .,			Address	
	•				. 60 .
Street Address & City of Well Location Locate with "X" in Section Below		etch Mep:		Address Same As Well Locatio 4 WELL DEPTH: (completed)	n?
	•			51 n.	10-27-85
				5 Cable tool Rotary	Driven Dug
				☐ Hollow rod ☐ Auger	Derret .
╹┉┠╌┈┩╌╌╂╶╌╬╌╌┥┺┰┅		•		6 USE: Domestic Type !	Public Type III Public
				Impation Type II	Public Heat pump
				Test Well Type II	
				7 CASING: Case Thread Thread	
MILE		THICKNESS	DEPTH TO	Happic Welder	TO-LO
2 FORMATION DES	CRIPTION	STRATUM	STRATUM	in to ft_ depth	Weightlbs./ft.
			1. 3	Grouted Onll Hole Diameter in. to ft. depth	Drive Shoe
Brown sand	- brown clay	<u> </u>	41	in. to ft. depth	No
Mad mand		10	51	8 SCREEN:	Not installed
med. sand,	gravel-water	10	<u> </u>	Johnson 12	Diameter
			ł	Slet/Goods 12	ength
<u> </u>		 	<u> </u>	, <u> </u>	and 51 ft. Lead Packer Bremer Chack
			l	Blank above screen	בותחות ון
		<u> </u>		9 STATIC WATER LEVEL:	
			<u> </u>	16 ft. below land	
		1-11		10 PUMPING LEVEL: below land su	face EO
		, \	\\ \	35 It. after 3 hrs. 1	pumping at G.P.M.
•	•		13	ft. after hrs.	pumping at G.P.M.
			15.7	11 WELL HEAD Pilless ad	spler 🔀 12" above grade
	, ·	~ 10	96 ~ -	COMPLETION: Basement	
	1			12 WELL GROUTED? No	Yes From to ft.
	1.:		<u>, i</u>	<u> </u>	
•		1		_	ŀ
			· ·	No. of bags of cement	Additives
			.	Type septic Distan	ce 54 ft. Direction north
				Well disinfected upon completion	Yes No
	•			14 PUMP Not installed	Pump Installation Only Jacket
				Mandiactorer & Hame	* 220 -
	•			Model number35	- "
	DECE	7/50		Length of Drop Pipe	ft. capacity G.P.M.
	1/10). 1000 01			PRESSURE TANK	
		W	1.7	Manufacturer's name	
USE A 2ND SMEET #		1:03		Model number	Capacity Gallons
15. Remarks, elevation, source of	r data, etc.		This well	R WELL CONTRACTOR'S CERTIFIC If was drilled under my jurisdiction and	
	n de la companya de la companya de la companya de la companya de la companya de la companya de la companya de La companya de la companya de la companya de la companya de la companya de la companya de la companya de la co		••	est of my knowledge and belief.	i 0h30
		का - लहन	Fet	tig's Well Drill	
	•	,	Address	5575 Jackson Bl	vd. Davisburg
· ·			•	V 2-11-0	1-16-86
)67d 2/84		1,1,	Signed .	AUNORIZED REPRESENTATIVE	· Date
**		A.			hority: Act 368 PA 1978 nplotion: Required

GEOLOGICAL SURVEY NO

AUG 0 6 1984			417.356.5.4	· · · · · · · · · · · · · · · · · · ·	PERMIT NUMBER
OAKIAN	HIGH LANG	1	SE	SE.SW. 13	Range Numb
10[Burger King	
Street Address & City of Well Location				Address Same As Well Location	Ves No
Lucate with 12 of Section Below	Şı	eich Mac		4 WELL DEPTH (completed)	Date of Completion
				5 Parat + 1001 Pagary	5-5-84
				Holick rod Auger	Dr.ven Du
*				6 USE Damestic Type P.	=
				☐ rest Well ☐ voe its	
				7 CASING Steel Threader	
		THICANESS	DEPTH TD	4 Plastic Theided	Surface ft
3 FORMATION DESCRIP		OF 5'RA'UW	NUTARES	Grouted Dr. Hole Diameter	Drive Shoe Tres
Brown	and	5	5	10 11 depin	□ No
Brown Fin	Gravel	15	20	1 Tree Stainless D.	Not installed
Green Men	O Harro	10	30	Sic	ng:n 4 1
210 01	~ www.	1,-7	1/7		and La 1: ead Packer Bremer Check
Due Cl	sy_		7)	9 STATIC WATER LEVEL	Other
Med das	od (grus)	10	57	33 ti below land si	
Fine	Travel	10	67	10 PUMPING LEVEL below land surf. 50 It after 2 hrs ou	_
		1			mping at G P M
· · · · · · · · · · · · · · · · · · ·		 	<u>: </u>	11 WELL HEAD	lei Joove grage
				Basement o	lisei Approved pit
			!		Yes From 10
		t		🗆 Ness sement - 🗋 Bericht	• Oine:
		<u>:</u> 		No or cass of cement Ac 13 Nearest yource of possible contem	d Net
 		<u> </u>		Storm Draid	75 10 0000 E
	**	1.	i	i 1 – Well die hiebred upen kompler bil ⁿ	
	• • • • • • • • • • • • • • • • • • • •	i	!	Na: Instance	Pume installation Only
/* # * * * * * * * * * * * * * * * * * *			i -	Manufacturer's name	DACKET MP Voirs 220
	7 (!		Length of Dress Pipe 50	ft capacity 18 G
		· · · · ·		i terri i i i i i i i i i i i i i i i i i i	1 v 7 1
	ĎEOC IVI			Manufacturers name WE/	(-X-/ro/
use A 2ND SMEET IF NEED 15 Remarks elevation source of date		blic Healt	16 WATER	Mode Combet	TION
INFO BY DRILLER, HAM ML			This well to the pe	If was diffed under my jurisdiction and t exhibit mulkning leager and behalf	his report is true
ECTED BY	JUN 2 6 19		4	mest (Maria, 11	Jebbellen Trele
TION Di	reau of Environm	ental and	Address	870 N. S. tew	ele Highend.
10 kilcs	ccupational Healt	n · GWQS		Markall Bar	5-14

AUG 0 6 1984	W ER		AND PO	PERMIT NUMBER
	HighlAn	d	1564.	SE1/2 SWill 13 2 NO 7 EN
Distance And Sirection from Poad The				Burger King
Street Address & City of Well-Edication				Address Same As Well Location?
Locate with Section Below	5	kerch Map		4 WELL DEPTH (completed: Date of Completon
				5 Karle tool 5-3-84
				Driver Duç Driver Duç
*				6 USE Domestic Type Public Type III Public
				Imgalian Type is Public meet pump
x			+	7 CASING Diameter Steel Threaded Height Above
1 4/16				/ Plastic (Stellage - /
2 FORMATION DESCR	FFT CALL	THICKNESS OF STRATUM	DIPTH TO	# on to 62 to decir Surface It 10 10 11 12 12 12 13 14 15 15 15 15 15 15 15
	· · · · · · · · · · · · · · · · · · ·	T		Greate Dell Mole Demerer
Brown Land		5	-5	in 10 ti dent
Brown Fine	4.000	15	20	B SCREEN Not Instance
- Chown Pin /	Guara	1.5	 	Type Staronless Damerer 3"
Livey Med s	Gravel	10	30	Ser terween 5 8 11 and 62 11
RP CO		17	47	FITTINGS Packer E Lead Packer E Eremer Check
_ Due Clay	1	+//		9 STATIC WATER LEVEL
med san	d (Crey)	10	57	3.3 ti- below land surface Flow
E 4.		5	62	10 PUMPING LEVEL below land surface
The sta	va	 	102	50 It after 2 n's pumping at 30 G P M
				ft_afterhrs_pumping at G P M
				COMPLETION THESE agapter accve grade
		 	 	Basement offset Accroved pi: 12 WELL GROUTED? Ves From 10
			<u> </u>	
				- rear cement
		 	'	No of pags of cement Additives
				Storm Draw 75 Dans E
• ,			:	We as riested upon completion? The Ties
		<u> </u>		14 PUNE Not Installed Pump may also On.
				Marulacturers name Red Tacket
			!	Mode number 100 WESCC HP 1 Vois 220
······································	PECE	11/50	 	Length of Drop Pipe
·	RECE	Public He		PRESSURE Well-X. Trol
		Tour ne	g:(!)	To 2
15 Remarks elevation source of		5 1984	16 WATE	R WELL CONTRACTOR'S CERTIFICATION
UED INFO BY DRILLER, ITAM MA	Bureau of Enviro	onmental :	This w	ell was diffed under my jurisdict on and this report is true best of my enowledge and tief ef
ORRECTED BY	Occupational H	ealth · GW	s 4.	ment C. Thoras Well dealling fine 63-11
ADDITION BY	ļ			RECISTERED BUSINESS NAME REGISTRATION NO
EVATION EPTH TO ROCE	ļ		Addres	Con Alli Trula
06°a Rev 10'80			_ Signed	AUTHORIZED PREPRESENTATIVE Date 5-14-67

DOLLA 1563 V TER WELL AND PUMP RECE D PERMIT NUMBER PAST 1, 1 ATT 368 PA 1918 Section 102 NE". NE. SW. 3 Commenter Like Locate with " . Section Below 4 WELL DEFTH (complete) Date of Completion " (5 X Cat 4 100 □ = ; · · · · Driven Det word ____ áuger 6 USE Z Domestic Trate - Public Type III Public --- pai-on ∏inde de Public Heat pump Test Well Type He Public 7 CASING Steel Threaded | Meight (Above Below Plastic ... We ded | Surface or to Sik it nepth DEPTH TO BOTTOM OF STRATUM THICKNESS We gat ____ FORMATION DESCRIPTION OF STOATUM Granes Drot Mole Diameter Drive Shae . if 10 ___ __ it des:*-Not installed 20 1. Johnson SS 9 1: and 506 11 FTTINGS & KiPacher | Lead Pacher | Bremer Check 5-a-) above screen ____ to 9 STATE WATER LEVEL ☐ Flow to below land surface 10 PUMPING LEVEL below land surface _ fi after ____ his pumping as 20 _____ It after ______ his pumping at ___ 11 WE .. HEAD COMPLETION 12' above grade Pines: adapter Approved pit Basement offset 12 WELL GROUTED? Near cement Egrismie | Orner No or cags of cement ______ Additives 13 Nearest source of possible contamination. __ Distance ______B Direction _ Weild sintected upon completion? 🔲 Yes 🗀 No. Not installed Pums installation Only Manufacturer's name ____ भारत है से दिवंड Length of Drop Pipe _____ _ It capacity ___ Submert tit ______ PRESSURE TANK Manufacturer's name. JUNE 2ND SHIET IF WEEDED Model number __ Gallons 16 WATER WELL CONTRACTOR'S CERTIFICATION emarks elevation squice of data, etc. AUDED THEY BY ORICLER, USE NO. * DENECTED BY .. ADDITION BY ELEVATION PO BO DEPTH TO ROCK

CEUTUSIEN CHBNEN CUEN

APR 2 9 1999	WATER V		
1 LOCATION OF WELL County Township Name		Fraction	Section Number Town Number Range Number
sapland oppler		NN % A	VEXNEX 24 3 NS. 7 EW.
Distance, And Direction.from.Boad.tetander	11 -		3 OWNER OF WELL:
	1.		Address
gitteet address & City of Well Location	11 . [1	راسر ر	2336 W Highland Cl- dept
	ich Alep:	:.	4 WELL DEPTH: (completed) Date of Completion
			71 n. 1-18-1979
,			5 🔀 Cable tool 📗 Rotary 📗 Driven 🔲 Dug
			Hollow rod Jetted Bored
			6 USE: Domestic Public Supply Industry
▗▗ ▗ ▗ ▗ ▗ ▗ ▗ ▗ ▗ ▗ ▗ ▗ ▗ ▗ ▗ ऽ ऽ ऽ ऽ			☐ Irrigation ☐ Air Conditioning ☑ Commercial
			7 CASING: Threaded Welded Height: Above/Below
1 MILC			Diam. 4/// Surfacen.
2 FORMATION	THICKNESS	BOTTOM OF	in. toft. Depth Weight lbs./ft.
1	STRATUM	STRATUM	In. toft. Depth Drive Shoe? Yes No
Sarl class	18	18	Tropopheson Steeless 4
		-1	Slat/Gooze 10 Length 4 Ff
Sard/eley/5 Grand	36	54	Set between 62 ft. and 21 ft.
Shad / Brand	10	64	Fittings: K-Packer & Tail Jupe
Sard witer Benny	7	11	9 STATIC WATER LEVEL
Barry Wall I start	+-	//	30 ft, below land surface
			40 ft. strer 1 hrs. pumping 40 s.p.m.
1			40 ft. after 1 hrs. pumping 40 g.p.m.
			11 WATER QUALITY in Parts Per Million;
	 	<u> </u>	Iron (Fe) Chlorides (C1)
1			
	+	 	12 WELL HEAD COMPLETION: In Approved Pit
•			X Pitless Adapter X 12" Above Grade
	1		13 Well Grouted? Yes No
	 -		Nest Cement Bentonite
1			Depth: From ft. to ft. 14 Negrest Source of possible contamination
	+	 	140 test \$ Direction Septer Type
			Well disinfected upon completion Yes No
			15 PUMP: Not insurted
	 	<u> </u>	Manufacturer's Name Taut
ELLIEU.			Model Number 5.57 HP 2 Volts 230 Length of Drop Pipe 42 tt. capacity 10 G.P.M.
	 	 	Length of Drop Pipe_72_ n. capacity_72_G.P.M. Type: [7] Submorable
(4)	<u> </u>		Jet Reciprocating
APR 2 PM			
16 Remarks, elevation, source of data 30		17 WATER	WELL CONTRACTOR'S CERTIFICATION:
[A		This well	I was drilled under my jurisdiction and this report is true
ADDED INTO BY DRILLER, TEM ML		Pant	21 my Will stilling 03/1
*CORRECTED BY		- REGIS	4794 Moul Le W- Hoyla
ELEVATION BY		Address	
DEPTH TO ROCK		Signed	Part 3elony Date 1-21-79
D67d 100M (Rev. 12-68)		, -	AUTHORIZED BARESENTATIVE

7 0.01020		P 1	
FEB 2 8 1930	WATER V	WELL REC	CORD MICHIGAN DEPARTMENT
	ACT 29	4 PA 196	OF PUBLIC HEALTH
County Township Name C		Fraction	
Cen Kath	.).		110 111 714 2
Distance And Disdring Land		1 7/	13 OWNED OF MELLE:
1			Address
1s			The state of the s
Locare with " in section below Sketch	h Map:		4 WELL DEPTH: (completed) Date of Completion
			78 n. 10-1-77
1			5 Cable tool Rotary Driven Due
			Hollow rod Jerned Bored
*			6 USE: Domestic Public Supply 1ndustry
			Irrigation Air Conditioning Commercial
			Tast Well
			7 CASING: Threeded Welded Height: Above/Selow
I will	THICKNESS	DEPTH TO	Surfaceft.
2 FORMATION	OF STRATUM	BOTTOM OF	
	SIRAIVE	PIRALUM	in toft. Depth Drive Shoe? Yes 780
May 8	20	30	
7.00			Sion Gauza Length
Grand J	12	132	Set between 7' h, and 7 h.
111	- ,	19	Fittings:
Blue (lan	136	00	
(001)	12	70	9 STATIC WATER LEVEL
Jan y Chan	10	10	1. below land surface
			10 PUMPING LEVEL below land surface 1/ Z ft. after hrs. pumping 20 fs.p.m.
	 		t, after hrs. pumping g.p.m.
} ·			ft. after hrs. pumping g.p.m.
			11 WATER QUALITY In Parts Per Million;
			Iron (Fe) Chlorides (CI)
	· ·		HardnessOther
			12 WELL HEAD COMPLETION: In Approved Pit
1,011			Pitless Adapter 212" Above Grade
(1)			13 Well Grouted? Yes No
			Neat Coment Bentonite
181	.]		Depth: From ft. to ft. 14 Nearest Source of possible contamination /
	ł	ļ	les (A) Direction Type
	1		Well disinfected upon completion Nes Ne
	₩		15 PUMP: Mpt insystled
\$69	1		Manufacturer's Name
			Model Number 91/2 - 2 HP Svolts 220
6,			Length of Drap Pipe 1 24-capacity (CG.P.M.
			Type: Submersible
			Jet Reciprocating
USE A 2ND BHEET IF NEEDED	L	13 10 2 2 2 2	HELL CONTRACTORS CONTRACTORS
16 Remarks, elevation, source of data, etc.			WELL CONTRACTOR'S CERTIFICATION: II was drilled under my jurisdiction and this report is true
ADDED INFO BY DRILLER, ITEM NO.		IN IN DE	es of my Anbyledge and belief.
*CORRECTED BY		(SAREGIS	ISTERED BUSINESS HAME- PEGISTRATION NO.
ADDITION BY			Syon be tendo
ELEVATION DEPTH TO ROCK		Addross	1 ~
DEPTH TO ROCK		Signed	ene 10 nous Date 10-2675

1 LOCATION OF WELL	WATER \			, A	ICHIGAN DEPA OF PUBLIC HEA	
County Township Name		Fraction		Section Number	Town Number	Range Number
sollard thople		NWAS	WINES	24	→ N/S.	7 F/W
Distance And Direction from Road Intersections		10.00.00	3 OWNER OF		0	
			(- v	
			Address			
Street address & City of Well Location			1	<u>- · - · · · · · · · · </u>		. 1
Locale with "X" in section below Sket	ich Map:		4 WELL DEPTH	: (completed) C		•
				3 n.:	9-13	-1979
<mark>┠┡╼╃╼╬╾╬┈</mark> ┩			5 Cable 10		y Drive	m Dug
			Hollow r		d Bores	<u> </u>
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			6 USE: D Don	=	c Supply	Industry
1 - 1 - 1 - 1 - 1 mi.			=	- =	onditioning	Commercial
			7 CASING: 5	well Welded		
			Diam.	readed [] Welded	Height: Ab	
I MILE	THICKNESS	DEPTH TO		4	1 -	
2 FORMATION	OF STRATUM	BOTTOM OF	in. to	ft, Depti		<u>/</u>
		3.44.04	B SCREEN:	<u> </u>	r less	7 143 F 140
Sand/elan	18	11	Type: Ost	marriel	Dia.:	4
			Slot Gauze	10	Length	171
Sand Clay France	36	54		59 ft. and _		•
			1			
Sand Gravel Wales	. •		1	Packer	- Jul	pipe
			9 STATIC WATE	R LEVEL		
Berry	9	63	30	ft, below land sur	face	
			10 PUMPING L	EVEL below land s	urtace	
			_35	h. efter <u>L</u> hrs. p	ourroine3	
	j		1			
				ft. after hrs. p		g.p.m.
				LITY in Parts Per		
		·	I Iron (Fe)	Chlor	1988 (C1)	····
•	i	1	Hardage	Other		
			12 WELL HEAD	COMPLETION:	In Annual P	i.
				less Adapter		
,				d? Yes No		
1				ement Bentoni	ite 🔲	
T			1 —	mtt. i		
				rce of possible co		
.				S		
				cted upon complet	tion 🔀 Yes 🗌 N	10
MILLION STATES	1		15 PUMP:	-	ot installed	
				ir's Nome	31.	
/Q.7 \\ \Z\				M TEC		
1-7-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	\		1 .	roo Pipe <u>42</u> h.	. capacity <u>~~</u> G	.P.M.
6 APR21 1990 = 3	al l		Type: 🔼 S		3 Anning Santa	
1 1 20	7 		D·	ter (Reciprocating	
USE A PROTUNCET IF HEEDED TH	<i>7</i>					
16 Remarks, elevation, source of data, etc.		17 WATER	WELL CONTRA	CTOR'S CERTIFI	CATION:	
AUUED INFO BY DRILLER TEN B		This wel		der my jurisdictio	n and this report	/
*CORRECTED BY	•	1920	151 Olymy knowle	mul	1 grill	m 0311
- ADDITION BY //13		REGI	STERES SUSINESS	HANGE O	REGISTR	AZON NO.
ELEVATION		Address	4794	1. Buck	ZH ES.	
DEPTH TO ROCK		/	21	2.1		70
W.339		Signed	AUTHORIZED WELL	Xeny	Date <u></u>	16-79
D67d 100M (Rev. 12-68)			AUTHORIZED ME	AL SERIATION	•	

WATER WELL RECORD ACT 294 PA 1965

MICHIGAN DEPARTMENT OF

1 LOCATION OF WELL			PUBLIC HEALTH
saklard Highlar		Fraction	NY NW Y 27 T-3 N/S. Ronge T-3 N/S. R.7 E.M.
D ence And Direction from Road Intercent	WHER No		3 OWNER OF WELL
The second of th	WHER HE	- Z	
	D	- · - · ·	Address
S' et address & City of Well-Location	A.4.	<u>,</u>	
2	THICKNESS	DEPTH TO	4 WELL DEPTH: (completed) Date of Completion
Z FORMATION	STRATUM	STRATUM	6511. 6-10-1967
			5 D Cable tool Retary Driven Dug
1'2-50-Sand- white cour	40	40	Hellow rod Jened Bored
1 1:4			6 USE: Domostic Public Supply Industry
12-50 - Sand - White Cours	4 10	50	☐ Irrigation ☐ Air Conditioning ☐ Commercial
			Tost Wall & apte
50-65-Cearse water Send	15	65	7 CASING: Threaded Welded Height: Above/Below
			in. toft. Depth surfaceft.
		{	Weight
			in. toft. Depth Drive Shoe? Yes No
·			8 SCREEN:
	· · · · · · · · · · · · · · · · · · ·	 	Туро: 10
			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
\	 		Slot/Govze Statted Longth 4 ft
·			Set between 6/1. and 65 11.
	1		
			Fillings: Y-Placker - 16 an - Blank
·			9 STATIC WATER LEVEL
	1		10 PUMPING LEVEL below land surface
·	1		25 ft. after hrs. pumping 45 g.p.m.
		<u> </u>	- Pomping
		l	2.5 ft. effor L hrs. pumping 45 g.p.m.
	+		11 WATER QUALITY in Ports Per Million:
		İ	Iron (Fe)Chlorides (CI)
	-		
	1		Mardne s s
			12 WELL HEAD COMPLETION: In Approved Pit
	1	i '	Pitless Adapter 2 12" Above Grade
	1		13 GROUTING:
	į		Wall Grouted? Yes No
			Material: Nest Coment
			Depth: Fremft. toft.
			14 SANITARY:
L	<u> </u>	1	Negrest Source of possible contamination
			75 lost W Direction Septer Type
	<u> </u>		Well disinfected upon completion W Yes D No
			15 PUMP:
<u> </u>			Manufacturer's Name
			Model Humber A-10-A4/2 HP
	1.		Length of Drop Pipe 42 ft. capacity 200, P.M.
	T		Type: Submersible
	1		Jot Reciprocating
Remarks, elevation, source of data, etc.		17 WATER	WELL CONTRACTOR'S CERTIFICATION:
	•		Il was drilled under my jurisdiction and this report is true
ADDED INFO. BY DRILLER, ITEM NO.		to the be	est of my knowledge and belief.
•		(Jan	y geory wee purey 03/1
CORRECTED BY:		•	chall the Aught The
A CONTENTION BY		Address	7774 11 Duck W 22.
eamortion. Ble.		Signed	Faul 7 closes Date 6-30-67
<u> </u>			AUTHORIZED REPRESCHIATIVE

WATER WELL RECORD

MICHIGAN DEPARTMENT

1 LOCATION OF WELL	·					PUBLIC HEA	LTH
County	Township Name		Fraction	er en	Section Number	Town Number	Range Number
OPKIA NO Distance And Direction from Roa	141941AND		39 % e	se sw		3 N/A:	EX
Distance And Direction from Roa	d Intersections			3 OWNER OF	WELL:		
i				1.2			
		ř		Address			
Street address & City of Well Los	cation						
Locate with "X" in section b	olow . Sketch	Mop:		4 WELL DEPTH	d: (completed)	Date of Completio	•
• []				7 3	ħ.		
				5 Cobie to		ary Drive	^ Due
				Hollow	=	ted Dorec	= = =
				6 USE: Do			
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> SEP 21 1981	WATER V	WELL REC							
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Distance And Direction from Hose Intersections			3 OWNER OF WELL:						
	•		Address						
Street address & City of Well Location									
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		-	Cable tool Retary Driven Dug Hollow red Jetted Bared						
[*] *┝┈╡╾┼┈┼╌┤ ┰			6 USE: Domestic Public Supply Industry						
I I I I I I I I I I I I I I I I I I I			Irrigation Air Conditioning Commercial						
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l Process Cond	32	31	Type: /Gravel Dia.:						
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Fine Sand & Gravel	8	72	It, after 2 hrs. pumping 30 g.p.m.						
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1			13 Well Grouted? Yes No						
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1Air_	J		Manufacturer's Name Sta Rite						
1 151 231 -	}	i	Model Number 20P4D02S HP 3H Volts 230						
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	<u> </u>		Jet Reciprocating						
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16 Remarks, elevation, source of data, etc.	<u> </u>	17 WATER	WELL CONTRACTOR'S CERTIFICATION:						
1		This well	I was drilled under my jurisdiction and this report is true as of my knowledge and belief.						
			DS N. LRYMAN						
ADDED INFO. BY DRILLER.	ITEM ME		· ·						
CORRECTED BY		Address	10275 Eagle Rd. Davisburg, MI 48019						
$\int \int \mathcal{U}^{2}$	D.R.L.	Signed	James 71. Jaynic Nov. 7/30/81						
D67d 100M (Rev. 12-68) 170 ITHON ETW		Ţ	AUTHORIZED REPRESENTATIVE						

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County Township Name	1	Fraction	15 c /
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.			5 Cable tool Rotary Driven Due
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╻┝╌ ╡╸╴┆╶╶ ┆╌┤ [╻] ┉╵		•	Test Well
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ار الله الله الله الله الله الله الله ال			Manufacturer's Name 14 W
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	ļ <u></u>		Length of Drop Pipe <u>30</u> ft. capacity <u>10</u> G.P.M.
			Type: Submeraible
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USE A 2MB SHEET IF MEEBED	<u> </u>		
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ADDED INFO BY DRILLER, HE	K NO-		eer of my knowledge, and beliefs
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Water Gravel and Sand 201 601	Water Sand		 7'	40"	Diem. Threaded Welded Height: Above/					
COATAB Grave W/sand 16° 761 Sorres No. Johnson Statules Typepop Step Dis. 6" Bofference 60 Longth 10°-1" Soft between 65 h. and 76_h. Finings: 5" x 17" Napple 5 STATIC WATER LEVEL 23 h. below land surface 10 PUMPING LEVEL below lond surface 10 PUMPING LEVEL below lond surface 11 WATER QUALITY in Perir Per Millian: lean (Fe) Chievides (Ci) Hardness NONE 12 WELL HEAD COMPLETION: la Approved Pit Pitiess Adopter 12" Above Grade 13 GROUTING: Well Grades 12" Above Grade 13 GROUTING: Well Grades 12" Above Grade 14 Above Grade 15 PUMP: Newser Source of passible contamination feet Direction Type Well distincted upon completion Type Well distincted upon completion Type Well distincted upon completion Type Well distincted upon completion Type Montroctures's Name Jacusty Model Number 10 SchW272 NP 10 Longth of Drop Pipe 46 h. copping 235.0.P.M. Type: Submercible Reciprocating 17 WATER WELL CONTRACTOR'S CERTIFICATION. This well west distincted during my institute and this report is true to the best of my knowledge and belief. O. O. COPPRET ELEMENTARY SCHOOL IN HILPORD Address 1501 W. 11 Hile Road Oak Park 4823 States 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 1501 W. 11 Hile Road Oak Park 4823 Down 15	1		1		D_in. to 65"-7"h. Depth surface_ 1"-5" K					
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14 SANITARY: INKNOWN Nearest Source of possible contamination feet			 		Material: Neat Cement					
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Sept			1		· CENTADIKN					
Well disinfected upon completion	·		 		• • • • • • • • • • • • • • • • • • • •					
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17 WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. ADDED INFO. BY DRILLER. ITEM NO. ADDRECTED BY: Address 15101 W. 11 Mile Road. Oak Park 4823 Signed 44 Key Designed Designe	1		1							
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enandition By: Signed Like Dorduly 9, 1969	CORRECTED BTI			Address						
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	APVIDITION DIT	. <u>^</u>		, (MANAGE OR SERVICE .					

APPENDIX E

MDNR INTEROFFICE COMMUNICATION - WELL DATA (REF. 3)

INTEROFFICE COMMUNICATION

REFERENCE _

SITE NAME Hi - Mill Manus

): Problem Evaluation Committee

Subject: Hi-Mill Manufacturing

From: Ron Willson, Biology Section

Da :: March 1, 1978

Hi-Mill Manufacturing has an aluminum annodizing process and fabricates tubular aluminum and copper parts. Nitric acid, sulfuric acid and dichromate solutions are utilized. Lead has been used in the past. Process wastes are discharged to a seepage lagoon which is adjacent to a marsh tributary to Waterbury Lake.

In April, 1972 staff investigated a complaint by employees expressing concern that two wells providing drinking water within the plant were contaminated by the seepage lagoon. Elevated copper (0.38 mg/l was found in the east well. All other parameters in both wells were normal. At the same time the adjacent marsh waters contained low pH and high levels of nitrates and copper.

Additional samples collected on October 9, 1975 showed high levels of nitrates, copper, aluminum, zinc and chrome in the marsh waters. Elevated nitrate, copper, nickel and aluminum in lake shore waters indicated movement of contaminants to Waterbury Lake.

A state groundwater permit was issued on October 31, 1975. Required monitoring wells were never installed. In Fall, 1976 a second lagoon was constructed without Water Quality Division approval. Direct overflows to the marsh occurred in December, 1976 and November, 1977.

A Notice of Noncompliance was issued on March 2, 1977 for failure to submit required monitoring reports. On March 15, 1977 the company was requested to apply for an NPDES permit. A proposed permit was issued on September 16, 1977. On November 18, 1977 U.S.-EPA informed the Water Quality Division that they could not concur with the issuance of an NPDES permit.

On December 13, 1977 Hi-Mills Manufacturing indicated an intent to implement a total recycle system and eliminate all waste discharges. A draft consent order requiring the elimination of all waste discharges, removal of lagoon waters and sludges and submission of a PIPP has been prepared and will be issued shortly.

Immediately following ice-out staff will sample company wells, lagoon waters and sludges, marsh waters and sediments and lake shoreline waters and sediments. Lagoon sample results will assist in assuring proper disposal of wastes in accordance with the proposed consent order. The well, marsh and lake samples are to broaden our information on previous ground and surface water contamination.

Recommendations

- 1. Staff should proceed in formalizing the seepage lagoon elimination, waste removal and PIPP preparation with the consent order.
- 2. Staff should perform the well, lagoon, marsh and lake samplings at the earliest opportunity.
- 3. The company should perform a hydrological survey of the site and provide analyses for pH, NH₃, NO₃, SO₄, Su, Ni, Al, Pb and Zn. To more accurately define the extent and severity of groundwater contamination.

RW:mm

APPENDIX F

MDNR STAFF REPORT - APRIL 1978 INVESTIGATION (REF. 4)

Mater Quality Division
November 14, 1978

STAFF REPORT

REFERENCE //
SITE NAME HI-MIII Manu
SITE ID MED 005341714

Investigation of Hi-Mill Manufacturing Treatment Facility, Vicinity of Highland, Michigan, April 26, 1978

On April 26, 1978, Water Quality Division (WQD) staff conducted an investigation of Hi-Mill Manufacturing's waste treatment facility at the request of John Bohunsky, Chief of Field Operations, Water Quality Division. Hi-Mill Manufacturing is an aluminum anodizing plant which fabricates tubular aluminum and copper parts. The objective was to assess the impact their waste lagoon overflow has had on an adjacent marsh. The company had planned to eliminate their lagoon by March, 1978, but at the time of the survey they had not implemented the closed cycle system.

Summary and Conclusions

- 1. At the time of the survey, there was a direct overflow to the marsh from the lagoon. Water and sediment samples were collected from the company's well, lagoon and various locations in the adjacent marsh (Figure 1).
- 2. The water chemistry data (Table 1) showed elevated levels of nitratenitrite, ammonia, copper, zinc, and aluminum at all stations except the well sample (HM-2). No contamination of the company's well was indicated, however, the phosphorus level (1.76 mg/1) was unusually high. The elevated levels were a result of the lagoon overflow.
- 3. Sediment data (Table 2) indicated extremely high concentrations of copper, aluminum, and total chromium. Moderately elevated levels of zinc and lead were found in the lagoon and marsh. Copper and aluminum are used extensively in the company's process. Chromium, copper, zinc, and lead values were much higher than background data collected from Pontiac Lake, Oakland County (Table 2). These contaminated sediments could be a threat to waterfowl and shorebirds feeding in the marsh.

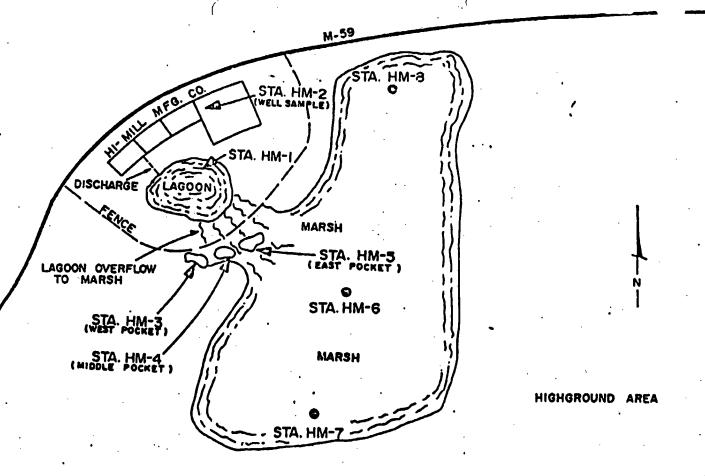
Recommendations

- Hi-Mill Manufacturing should cease its discharge to the marsh and implement their total recycle system.
- 2. Lagoon water and sludges should be properly removed and the lagoon filled with inert fill.

Sediment and Water Chemistry By: Environmental Services Laboratory

Field Work and Report By: James Grant, Aquatic Biologist
Richard Lundgren, Aquatic Biologist

Biology Section



HIGHGROUND AREA



Con atic....f se....ed p......eter. in water samples collected from Hi-Hill Hanufacturing's well and lagoon and from the marsh adjacent to the lagoon, vicinity of Highland, Oakland County, Michigan, on April 25, 1978. All values expressed in mg/l except pH.

Pa	ram	ete	rs.

Station Number	Station Location	BOD	COD	рК	NO.NO.	NH3	Tot-P	so,	Tot Cr	· Cu	иt	Pb	Zn	<u> </u>
E:-1	H1-Mill Lagoon Sample	7.2	27	4.9	160.	34,	0.88	128	4.0	30,	<.050	.070 ·	14	60.
HM-2	H1-H111 Hell Sample	•	18	7.7	0.03	0.19	1.76	14	<.010	oin.	<.050	<.050	<.010	<1.0
HM-3	West Pocket	•	`. •	7.1	33.	3.6	0.09	88	.060	.570	<.050	<.050	2.50	3.
HM-4.	Hiddle Pocket	-	. •	6.2	16.3	2.5	0.07	64	.050	.580	<.050	<.050 ·	.620	3.)
HM-5	East Pocket		. • .	7.4	152.	31.	0.12	140	.700	9.20	<.050	.070	8.90	34
₩:-6	Hiddle of Marsh	÷	•	7.7	11.1	1.51	0.07	56	.010	.440	<.050	<.050	2.20	2.0

Concentrations of selected parameters in sediments collected from Hi-Hill Hanufacturing's lagoon and from the marsh adjacent to the lagoon on April 26, 1978 in the vicinity of Highland, Oakland County, Hichigan. All values expressed in mg/kg except PCBs which are given in ug/kg (dry weight).

•		<u>Parameters</u>								
Station Number	Station Location	TOT-Cr	Cu	N1	Pb	Zn	1A1	PCB 1242	PCB 1254	PCB 1260
H1-1	H1-M111 Manufacturing Lagoon	2200	7800	43	110	650	29,000	< 500	<500 .	< 500
HM-3	West Pocket	310	2700	67	22	1700	51,000	•	•	
H:1-4	Hiddle Pocket	1200	2300	52	37 ·	120	27,000		•	
HM-5	East Pocket	. 570	5200	59	43	2000	51,000	•		
-H:4-6	Middle Marsh	1400	14,000	54	62	540	38,000		•	•
154-7	South and Harsh	870	21,000	53	110	1100	28,000		•	
- KM-8	North end Harsh	8500	51,000	35	170	. 480	32,000		•	
Control ·	Pontiac Lake *	5.8	0.8	22	58	68 .				

^{*} Unpublished data - Water Quality Division, MDHR - 1977

APPENDIX C

DEPARTMENT OF PUBLIC HEALTH LETTER -PROCESS WELL ANALYSES (REF. 5)



JAMES J. BLANCHARD, Governor

DEPARTMENT OF PUBLIC HEALTH

3500 N. LOGAN P.O. BOX 30035, LANSING, MICHIGAN 48909 GLORIA R. SMITH, Ph.D., M.P.H., F.A.A.N., Director

August 22, 1988

Mr. Dick Beard Hi-Mill Manufacturing 1704 Highland Road Highland, Michigan 48031

Dear Mr. Beard:

On July 14, 1988 a representative of the Oakland County Health Division and Michigan Department of Public Health collected water samples from your wells as a part of the groundwater monitoring program. Enclosed please find the laboratory report which lists the parameters tested, test results, standard health maximum conteminant level, if established, and minimum laboratory detection limits.

The results of the partial chemical analysis was satisfactory. The results of the volatile organic analysis revealed 0.004 mg/L benzene in well #1 and 0.001 mg/L trichloroethylene in well #2. The results of the metals analysis revealed 0.15 mg/L barium, 0.006 mg/L arsenic, and 2.0 mg/L iron in well #1 and 0.1 mg/L copper, 0.26 mg/L zinc, 0.007 mg/L lead, 6.5 mg/L iron, 0.19 mg/L barium, and 0.007 mg/L arsenic in well #2.

If you have any questions, feel free to contact Ron Holben at (517) 335-8329 or me at (517) 335-9175.

Sincerely,

Julie M. Parsons, Sanitarian Ground Water Quality Control Section. Division of Water Supply

Bureau of Environmental and

Occupational Health

JMP:s11



CHEMICAL_ANALYSIS OF WATER

Dureau of Laboratory and Epidemiological Services Michigan Department of Public Health 2500 North Logan, P.O. Box 38035 Lansing, HI 48707 Telephone (517) 335-8184 Mane.

P.3/9

Abbreviations: GT = Creater than given value KCL = State regulated maximum contaminant limit

LAB NU.: 8307-02891 TROGRAH CUBE: 22

?age: 1

REPURT TO

Date received: 87/18/09 Date reported: 07/22/08

Water Supply Division-HDMH 3500 W Logan, Bex 30035 Lansing, MI 48919

Esaminers in Charge:

Y.J. Williams, Sect Chief F.M. Saad, Assist Sect Chief

USSN.

HMM

Mand.

SAMPLE SOURCE INFORMATIONS

System Owner: RI-MILL #2 Street Address: 1704 HIGHLAID City or Two: HIGHLAND

GHLAND Location/Source:
Collected by: PAKSONS

or Two: HishLamb. Contected by: PARSURS, Date Collected: 07/14/88

		Standard	Detection
Test Hane	Tost Result	Health NCL	Test Linit
BRUNCHURH	Not Detected	1.15mg/1	0.801mg/1
BRONON, THANE	Hat Detacted		0.020mg/1
CARION II TRACHLURIDE	Not Detected		0.00ing/)
CIN INDIA NZENE	Het Detected	•	0.80img/l
CHLOROD) I: RONOMETHANE	Not Detected	0.10mq/1	0.801mg/3
CILORIE (HANE	Not Detected		0.820m4/1
CHLURUS ORA	Net Dotacted	0.15mg/]	8.081mg/l
CID.URUME INCHE	Not Detected		0.450mg/l
PICILOROPROMONETHANL	Not Betected	0.iBmq/1	0.00inq/l
DicHikufinane, 1,2-	Hot Detected	,	0.00ing/1
Dicianokuctname, 1,1-	Ret Detected		0.00ing/1
Dichlikus Thylene, Trans-1,2,	Rut Detected	·	1.041ng/1
DACHBURGE THYLENE, C15-1,2,	Not Dutected		f. 00 ing/1
DICHLURUPKORANE, 1,20	Not Detected		1\pai00.0
D) CILIRUPTUPENE, trans-1,3-	Not Detected		1.881mq/l
Dicaloraropene, cis-1,3-	Not Detected		0.00ing/1
ETHYLLKI, DIDRONIDE	Het Dutected	•	0.001mg/l
FLUDEOTE DE CHLOROPE THANE	Not Detected		0.010mg/l
HEXACIAL CRUITHANE	Not Dertected		0.901mg/l
HETRYLERI, CHLORIDI.	Not Pet e cted		9.00ing/1
TETRACIA URUETHANE, 1,1,2,2-	Not Detected		1.061mg/1
TETRACIA ORDETHYLEN:	Not Detected		0.801ng/1
TOTAL TRITIALIDAETHANES	Not Detected	8.i0mq/l	1.001mg/1
TRECOLORUS THANE, 1,1,2-	Not Detected	•	0.00ing/l
TRICHLOROLTHANE, 1,1,1-	Not Detected		0.001mg/1
TRICIA ORDETHYLEIGE (## 0.001mg/1		
VINYL COLORIDE	Not Detected		0.085mg/1
VENALTDERS CHAOKIDE	Hot Detected	•	0.001mg/1
BENZUM.	Not Detected		0.80ing/1
DICH.ORDILAZENE, 1,4-	Not Detected		0.001ng/1
DICHRORUMATERE, 1,3	Not Detected		0.001mg/1

(GUNITHUS)

CHENICAL ANALYSIS OF WATER

Dyreau of Laboratory and Epidemiological Services Michigan Department of Public Health 3586 North Legan, P.O. Box 39835 Lansing, HI 48909 Telephone (517) 335-8184

Abin adiations: GI = Greater than given value: Mil = brate regulated maximum contaminant limit LAB NO.: 8307-02371

Page: 2

PROGRAM CODE: 22

Date received: 87/18/49 Date reported: 07/22/08

Water Supply Division-HDPW 3508 R Logan, Box 38035 Lansing, XI 48919

Examiners in Charge:

T.J. Williams, Sect Chief F.N. Saad, Assist Sect Chief

SAMPLE COURCE INTURHATION:

REPORT TO

System Cumer: HI-MILL \$2 Street Address: 1784 HIGHLAND City or Tup: HIGHLAND

County: DAKLA

Location/Source:

Collected by: PAKSONS Date Collected: 87/14/38

		Standard	Detection
Tost Hone	Test Result	llealth MCL	Test Linit
DICHEDROPENZENE, 1,2-	Not Detected		0.001mg/}
ETHYLBENZENE	Net Detected		0.001mg/l
METITAL L'HIYE KETORE	- Net Detected		0.020 mg/1
MUTTIYL ISUBUTYL KETUNE	Not Detacted		0.020mg/1
STYREHL	Not Detected		0.00ing/1
TOLUTHE	Not Detaited		0.001mg/1
XYLENE	Not Detected		0.001mg/J

CHEMICAL ANALYSIS OF WATER

Bereau of Laboratory and Epidemiological Services Michigan Department of Public Health 3500 North Legan, P.O. Bex 30035 Lansing, MI 48907 Telephone (517) 335-8184

Abbreviations: GT = Greater than given value

MCL State regulated maximum contaminant limit

LAB NU.: 3387-02987

PROGRAM CONE: 22

REPURT TO:

Water Sepply Division-NDPH 3500 H Logan, Box 30035 Lansing, MI 48919

Date received: 87/18/03 Date reported: 87/22/00

Examiners in Charge:

1.J. Williams, Sect Chief F.M. Saad, Assist Sect Chief

HMM

SAMPLE STURCE INFORMATION:

System Cuner: HI-MILL #1 Street Address: 1704 HIGHLAND City or Tup: IIIGHLAND

County: DAKLA

WESN:

Location/Source:

Callected by: PARSONS Date Collected: \$7/14/08

		Standard	Detection
Test Kane	Togt Rosult	lleal th MCL	Jest Linit
ERUNUI UKH	Not Dutected	\$.10mg/1	0.001mg/1
8RUMMETHARE	Het Detected		0.120ag/1
CARRIN OF TRACHLORIDE	Not Detected		0.80img/3
CINLURGBICHZENE	Hat Detected		/\pni08.0
CIN_ORDD / DRIMBHETHAME	Not Detected	0.10mg/l	0.601mu/l
CHLORGE (HARE	Not Detected		0.020nq/l
CHLOROL UKH	Not Detected	8.10mg/l	0.001mg/l
CHLURDHITHIANE	Net Detect ed		0.058ng/l
DICHLOROLCOMOMETHANE	Not Detected	0.18mq/l	0.80ing/)
DICHLONDETHANE, 1,2-	Not Detected		/\pmi88.8
DICIRORUITHANE, 1,1-	Hot Detected		0.801nq/1
DICHLUKUS THYLENE, 1RANS-1,2,	Not Detected		0.01ing/1
DICHEDRUCTHYLENG, C15-1,2,	Not Detected		4.801mg/l
DICHI.URGI'ROPANE, 1,2-	Not Detected		0.00ing/l
D) CIE.DXU!'ROPENE, trans-1,3-	Not Detected		1.181mg/l
DICHIOROPENE, cis-1,3-	Not Detected		0.881mg/1
ETHYLEN, DIGRUHIDE	Net Detected		0.801mg/1
FILURIUK) CIROROMETHANE.	Xot Detected		0.010mg/1
HI XALIII DROLTHANE	Not Detected		0.00ing/1
METIMERE CIRORIDE	Het Detected		0.881mg/l
TETRACIN UNUETHANE, 1,1,2,2-	Ret Detected		6.001mg/1
TETRACHI DROETHYLENC	Hot Detected		0.081mg/1
TOTAL TRANSLONETHARDS	Not Detected	0.10mg/l	8.881mg/l
TRICHLURDITHANE, 1,1,2-	Not Detected		1/pai00.0
TKACHLOKULTRARE, 1,1,10	Not Detected		0.00ing/1
TRACIRORIO TRYLENC	Kat Detected		0.061mg/1
VARYL CHARGIDE	Het Detected	•	0.00Sng/1
VERYLIDERE CHLORIDE	No! Detected		0.001mg/1
RUKTHI ?	.1.084ng/1 \		
DICHLOROBERZENE, 5,4-	Not Detected		0.001ng/l
DICHLOROH HZENE, 1,3	Not Detected		0.805 Mq/l

CHENTCAL_ANALYSIS OF WALKER

Bureau of Laboratory and Epidemiological Convices
Michigan Dupartment of Poblic Health
3508 North Logan, P.O. Nov. 16576
Lansing, MI 48907
Telephone (517) 335-8184

Abbreviations: GT = Greater than given value MCL = Giste regulated maximum contaminant limit

LAK HU.: 8907-02837

Page: 2

PROGRAM CODE: 22

REPURT 10:

Date received: 07/13/33 Date reported: 07/22/68

Vater Supply Division-MDM 3500 K Lugan, Box 30035 Lansing, MI 48747

Examiners in Charge:

T.J. Williams, Sect Chief F.M. Saad, Assist Sect Chief

SAMPLE COURCE IN ORNATION:

System Duner: HI-HILL 41

Street Address: 1704 HIGHLAND

City or Twp: HIGHLAND. County: CAKLA **VS**57

Location/Source:

Collected by: PARSURS Date Collected: 87/14/UB

Standard Detection Test Hane Test Result Health MCL Test Linit DICHLORUBERZENE, 1,2-Hot Detected 0.001 mg/lETHYLPUNZENE Not Detected 0.081mg/l HETHYL ITHME KETONE Not Detected 0.829mg/1 MITTING ISORUTYL KETONE Rot Detected 0.020 mg/1STYRERI Not betected 0.891mg/l TULLENE Not Detected 6: 001 mg/1 XYLERE Not Detected 0.091mu/1

_CHEMICAL_ANALYSIS OF UNITER

Perezu of Laboratory and Epidemiological Services Michigan Department of Public Heatth (3500 North Logan, P.O. Box 30135 Lansing, NI 48987 Telephone (517) 335-8384

Abbreviations: CT = Creater than given value
NCL : State regulated maximum contominant limit

168 NO.: 8907-62872 PRECRAM COME: 22 hade: /

REPURT 10:

Hater Supply Division-MDPH 3500 N Legan, Ber 20035 Lansing, AI 48909 Date received: 87/18/33 Date reported: 08/15/33

transmers in Charger
T.J. Williams, Sect Chief
F.M. Saad, Assist Sect Chief

HMM

SOMME SHURCE INFURNATION:

System Owner: H1 MILL #1 Street Address: 1704 HIGHLAND City or Twp: HYCHLAND

County: DAKLA

VSSN:
Lucation/Source:
Collected by:
Date Collected: 87/14/08

Standard Detection Test Hake Test Result Health HCL Jost Linit AL UHIRLIK Ret Detected 8.85mg/L Not Detected CHRUMIUM, TOTAL 0.803m4/L Not Detected COPPER (RICOVERABLE) 0.1mg/L 8.05m1/L Hot Datected ZINC (RECHVERABLE) 8.163mg/L Het Detocted LIMB. TUTAL 0.050ng/1 IRON (RECHVERAGLE) 2. 1mu/L. DECEMBER TOTAL DISCULVED 1.0nu/) POR SHOW 0.050ma/1 ARGENTED TOTAL

CHEMICAL ANALYSIS

WASTER.

Rureau of Laberators and Epidemics. Scrulces Richigan Department of Public Courts 3505 North Legau, P.D. Sec. L. Lansing, MI 48909 Telephone (557) 335-6561



Abbreviations: Gf = Greater than given vale ACL : State requisted maximum contaminant limit

LAW HU .: UN37-12075

"aun: 1

PROGRAM CODE: 22

Date received: 57/10/th

Date reported: 08/12/83

Ecaniners in Charge:

T.J. Williams, Sect Chief F.M. Good, Assist Sect Chief

RCPORT TO

Hater Supply Division-MM'M 3500 R Legan, Bez 30835 Lancing, NI 40719

SAMELL COURCE IN DEMANAGE

System Comer: Hi-MILL \$2 Street Address: 1784 HIGHLAD

City on Ten: HICHAND County: OAKLA

1.ocation/Source:

Collected by: PARSONS Oute Collected: 17/11/38

		Standard	Detection
Test None	Tast Result	Health XCL	Test Limit
AL LIMIRUH	Not Detected	•	8.85mg/l
CHROMIUM, TOTAL	Not Batected	0.253ng/L	0.083m1/L
CURREN (RICOVERABLE)	4 PINIA	·	•
2140 RICOVERABLE	-0:2bma/b	••	
1916 1916	4-1:007Acc/	0.450mg/)	•
IRON (RECOVERABLE)	6.Smi/L	••	•
ALIVADER OF A TOTAL DIRECTOR	(XI) AITH	1.0mg/1	•
ARGENTEP TOTAL	2 20 87 mu/b	d.059mg/1	
. .			

Sime-24 br. format Date: (8-13)

Age (yrs.)-Depth (ft.)-Diam. (in.)

Somple Type (21)

17 Other (Describe on separate sheet)

Township:

Well No.

WSSN (14-20)

HI-MILL

폭 G

8

Ġ

Phone No.

Section No.1

Street Address:

Reason for Analysis (check):

s. Highland
Somple Collected by (manne):

Faucet, pump, corp tap, other

Sampling Point (circle):

Name of Supply:

PUSENS

Post Office --State - Zip Code:

704 High lacel
Collected at-Post Office (M1), Zip Code

☐ Rovtine

Source (circle):

8. Check and complete following line only if sampling a public water supply.

Well, surface water

Lecution Code (1-3) HIM IM

ANSING

100 JUL 15 PH 2:51

	d in the late	2. 3	11	2846
Gire of known information-T		Holl or th	eck inh.	LAS NO.
1. Report Results Biv. Of Wal	ler Supply, GWQC	s, bead}	1	Phone No:
Street Address:]
Post Office State Zip Code:				
2. Rosson for Analysis (check):	D toutine D	Other (Desc	ibe on separe	to shoot)
Supply Owner:				Phone No.
Sample Callected at . Street Add	r 05 81	Towns	hlp:	Section No.:
4 1704 Highli	me	- 1 1	liabla	M
Sample Collected at - PortOffice 5. Highland	(MI), Elp Code		Country	rland
combine confidence at featurests		Time		at Date: (8-13)
Parsons		(4-7)	1	ไม่รี่ไห้เ็ไก้"
Sampling Point (circle): 7. Favort, pump, corp tap, other	Source (circle): Well, surface water	Well Ne.	Age (yru)-	Dopth (fr.)—Otam. (In.)
8. Otherk and complete fallow	ico Tee only if somelie		veter supply.	
Name of Supply:		WESH		Sample Type (21)
9.				
	NOT WRITE BELOW-	LABORATO		
Code (27-30) Paramet	107		"Rosul	(31-34)

LAS NO. 8807-82846 (1) PROCRAM: 88 IRON (AUTONATED) SUDIUM (AUTOMATED)
NITRATE AS N (AUTOMATED)
HARMESS AS CACO3 (AUTOMATED)
COMBUCTIVITY (AUTOMATED) 1.7mg/L Not Detected 325me/L 63Benhes CHLURIDE (AUTOMATED) FLUURIDE (AUTOMATED)

("Unless otherwise	indicated s	usults given as mg/l)		
Date Reported (\$5-40)	-	M 21 98 2	Laboratory MICHIGAN DEPARTMENT OF PUBLIC MEALTH	/

LAB ID (22-26) 00001	DO HOT V	VRITE BELOW-LARC	MATORY RESULTS
Code (27-30)	Parameter		"Result (31-34)
	e		
LAT NO.	8847-02853	(1)	PROGRAM: 00
IRON (A	UTOHATED)	• • • • • • • • • • • • • • • • • • • •	1 14n/l
SUDION Nitrate	(AUTUVATED) As n (Autom	atëhi	i.ing/L i6nq/L Nat Datected 335nq/L 629unhos 66nq/L 0.ing/L
HARDIES	AS CACOJ (A	UTUMATED)	· · · · · · · · · · · · · · · · · · ·
C1/1,001,00	(AUTOHATED)	AIED)	629 unhos
FLUOR 104	E (AUTOMATED)		D. ling7L
			\mathcal{Y}

FB-32 6/64 By Authority of Act 300, P.A. 1976

("Unioss otherwise indicated results given as mg/l)

Examiner

APPENDIX H

BIOLOGICAL AND CHEMISTRY SURVEY REPORT (REF. 6)

REFERENCE 10
SITE NAME HI - MILL MANU
SITE ID MID 005341714

SECEIVED

MAR 0 6 1985

Michigan Department of Natural Resources
Surface Water Quality Division
Water Quality Surveillance Section
February 1985

ATER QUALITY DIV.

A Biological and Water and Sediment Chemistry Survey of Waterbury Lake and Adjacent Marsh Oakland County, Michigan April 26, 1984

Introduction

Surface Water Quality Division staff of the Water Quality Surveillance Section surveyed Waterbury Lake and a marsh east of Hi Mill Manufacturing Company to determine the potential impact of Hi Mill Manufacturing Company discharge on these water bodies (Figure 1). The survey was performed at the request of Hakim Shakir, Detroit District Groundwater Quality Division staff in connection with the groundwater cleanup operation at Hi Mill Manufacturing.

Conclusions

- 1. Waterbury Lake was not connected with the marsh east of Hi Mill Manufacturing and was not impacted by Hi Mill Manufacturing surface water discharges.
- 2. Marsh waters generally contained higher concentrations of heavy metals than the background stations in Waterbury Lake.
- 3. Concentrations of copper in marsh waters exceeded the chronic criteria for warmwater species of freshwater aquatic life.
- 4. Sediment heavy metal concentrations in the marsh exceeded background concentrations in Waterbury Lake and in many cases mean concentrations downstream of industrial and municipal discharges.
- 5. Algae and zooplankton were abundant in marsh waters but bottom dwelling organisms were limited to pollution tolerant forms. The lack of additional species may be due to limited water in the dry season or the nutrient enriched condition of the marsh waters.

Recommendations

- 1. Minimize the sources of heavy metals entering the marsh from the Ri Mill parking lot and roof drainage system.
- 2. Continue to fill the existing lagoon.
- 3. Determine if contaminated groundwater should be purged.

Background

Hi Mill Manufacturing has an aluminum annodizing process and fabricates aluminum and copper parts. Process wastes are discharged to seepage lagoons adjacent to the marsh east of their property. In 1972 elevated levels of copper were found in the adjacent marshland and one of the company's drinking water wells (SWOD File. Hi Mill Mfg. Co.). In 1975 additional water samples collected in the marsh revealed elevated concentrations of nitrates, copper, aluminum, sinc and chromium. File reviews showed lagoon overflows had apparently been occurring and in April of 1978 additional water and sediment sampling was completed in the lagoon and marsh. Recommendations were made to remove lagoon wastes and sludges and fill the lagoon (Grant, 1978). Home of the recommendations were accomplished, but no additional discharges were made to the lagoon after 1978. Hi Mill Manufacturing attempted to evaporate the lagoon liquid by spraying it into the air from the top of their building. This resulted in liquids entering the marsh through their roof and parking lot drain system. Groundwater samples collected in 1981 showed migration of elevated concentrations of aluminum, chromium, copper and zinc in the shallow water table (3 to 7 feet) and into the marsh (Sibo, 1982). As of November 1983, lagoon liquids and sludges had been removed and the lagoon itself was being filled.

Methods

Water and sediments for chemical analysis were collected and preserved according to "Quality Assurance for Water and Sediment Sampling" (MDNR 1981) and returned to the Environmental Laboratory in Lansing for analysis. Benthic macroinvertebrates were collected with a petite ponar dredge grab sampler and sieved through a number 30 mesh sieve. Organisms were identified with the naked eye on site and their abundance qualitatively assessed and recorded on stream problem assessment cards (Appendix A). Phytoplankton samples were qualitatively collected with a 64 micron mesh phytoplankton net towed at approximately a 45 degree angle, washed into a vial and returned to the Lansing Biological Laboratory and identified under the microscope at 400x power.

Water

Marshwater samples collected in 1984 contained lower concentrations of heavy metals than marshwaters at similar areas in 1978. However, concentrations of zinc, chromium, and copper were greater than those at the background location sampled in nearby Waterbury Lake. These data suggest that while heavy metal concentrations are decreasing in the marsh water they may still be leaching from the sediments into the water or continuing to enter from surface water discharges or contaminated groundwater. Neither chromium or zinc exceeded the criteria for freshwater aquatic life but the concentration of copper in the marsh water exceeded the chronic criteria (33 ug/1) for warmwater fish. Concentrations of total copper, zinc, chromium, and aluminum in the parking lot and roof

drainage were lower than the mid-marsh samples taken in 1978, but higher than marsh samples collected in 1984 indicating a continuing source of metals to the marsh. The copper concentration in the parking lot and roof drainage water exceeded both the scute and the chronic criteria for aquatic life. Contaminated groundwater resulting from the old seepage lagoons may also be contributing to heavy metals concentrations in marsh waters.

Sediments

Heavy metals in marsh and parking lots and roof runoff drainage sediments were higher than sediments collected in nearby Waterbury Lake Station 4 (Table 2). Total aluminum, total copper, total zinc and total cadmium were an order of magnitude higher while total chromium was two orders of magnitude higher in the marsh than in Waterbury Lake. These data suggest direct inputs of these metals to the marsh system from Hi Mill Manufacturing Company. Sediment total iron, total arsenic, total lead, total manganese and total lithium were also higher in the marsh than in Waterbury Lake. Mercury was detected only in the parking lot and roof drain outfall sediments. Concentrations of heavy metals in the marsh exceed the average concentrations downstream of industrial and municipal locations (Hesse and Evans 1972). It is not known if these sediment metals are leaching into the water column or are causing toxicity to aquatic insects, but bottom dwelling aquatic organisms were limited to tolerant midges in the marsh.

Aquatic Organisms

Only midges were found in the ponar grab samples collected in the marsh. These organisms are generally considered pollution tolerant. No other benthic aquatic insects were noted. The limited bottom dwelling community may be due to marsh water fluctuation (i.e., it may dry up in the summer) or it may be due to elevated concentrations of one or more heavy metals. Zooplankton were present at Stations 1 and 2. Daphnia sp. were very abundant at Station 2 nearest the old lagoon discharge where concentrations of copper in the water exceeded the criterion for aquatic life. It may be that these organisms blew in from another part of the marsh where copper was less concentrated. Other possibilities are that organic materials in the water column bound these copper molecules or that hardness and pH conditions created conditions reducing its toxicity. Daphnia are generally considered sensitive to relatively low copper concentration (Creal and Basch, 1981).

Only one fish was seen. A sudminnow was present near the outlet from the parking lot and roof runoff drainage system. The fish was dead with no evident cause. Hudminnows are tolerant of a wide variety of environmental conditions.

The presence of a variety of filamentous (Spirogyra) green algae, flagellates (Euglena) and other algae (Scenedesmus) Occystis, Synedra, Oscillatoria and Mougeotia) and macrophytes (Typha, Scirpus, Lemna minor, Elodea and Potamogeton) indicated that the discharge did not have much impact on these aquatic plants (Table 3).

Literature Cited

- Creal, W. and R. Basch. 1981, Water quality-Based Effluent LImits for Heavy Metals and Cyanide, MDNR, 124 p.
- Environmental Protection Bureau, Michigan Department of Natural Resources, 1981, Quality Assurance Manual for Water and Sediment Chemistry.
- Grant, 1978, Investigation of Hi Mill Manufacturing Treatment Facility, Vicinity of Highland, Michigan, April 26, 1978.
- Hesse, J. N., and E. Evans, 1972, Heavy Metals of Surface Water, Sediments and Fish in Michigan. Michigan MDNR, 58 pp.
- Sibo, K., 1982. A Hydrogeological Study of the Vicinity of Hi MIll Manufacturing, Highland, Michigan Department of Natural Resources.
- Surface Water Quality Division Files for Hi Mill Manufacturing. MDNR.

Survey By: John Wuycheck, Aquatic Biologist
Dave Kenaga, Aquatic Biologist

Lab Analysis By: Environmental Lab

Algal Analysis By: Carey Johnson

Report By: David Kenaga, District Aquatic Biologist

Michigan Department of Natural Resources

Water Quality Surveillance Section Surface Water Quality Division

Figure 1. 7, f 'and 'mt' "ich' 1, /-"1 2" 1984 STATION #1 STATION 1 HI-MILL MFG MARSH OLD [read] WATERBURY LAKE

Table 1. Concentrations of selected heavy metals in water in the vicinity of Hi-Hill Menufacturing Company, April 26, 1984. Results in µg/l. (1978 Results from Grant 1978)

Location Sampled	Total Aluminum	Total Arsenic	Total Iron	Total Hergury	Total Zinc	Total Cedmium	Total Chronium	Total Copper	Total Nickal	Total Lead	
At H-59 Hareh outlet	<400	<0.5	150	<0,5	23	0.2	2.8	48	<4	2.5	
Hid Harsh East of building	<400	<0.4	120	<0.5	22	<0,2	6.5	200	<4	<2.0	
Roof and parking lot runoff	964	1.3	914	<0.5	70	0.6	24	560	<4	<2.0	-
Outlet from Waterbury Lake	-	3.6	•	<0.5	•	<0.2	<2	3	<4	<2.0	
Hiddle of Harsh (1978)	-2000	-	-	-	2200	-	10	440	<50	<\$0	

able 2. Concentrations of selected heavy metals in sediments in the vicinity of Hi-Hill Hanufacturing Company, April 26, 1984. Results in mg/kg dry weight.

Location Sampled	Total Aluminum	Total Arsenic	Total Iron	Total Mercury	Total Zinc	Total Cadmium	Total Chromium	Total Copper	Total Nickel	Total Lead	Total Manganese	Total I Solida	Total Lithium
At H-59 Marsh outlet	29,200	7.5	19,900	<0.5	1,800	11.0	2,350	10,000	50	269	- 360	13	•
Mid Marsh East of building	16,100	4.2.	15,600	<0.5	1,500	8.5	5,300	5,650	.19	84	130	24	90
Parking lot and roof runoff	11,890	5.8	17,700	0.7	1,700	11.0	2,240	4,700	- 16	97	380	32	90
Outlet from	7,190	5.5	10,100	<0.5	150	<2.0	50	155	13	91	150	14	15

Table 3.

Aquatic plants found in the Marsh, east of Hi-Mill Manufacturing Company, Oakland County, Michigan, April 26, 1984.

Algae

Spirogyra

Euglena

Scenedesmus

Oocystis

Oscillatoria

Mougeotia

Synedra

Macrophytes

Typha

<u>Scirpus</u>

Lemna minor

Elodea

Potamogeton

Station Number 1		Investigator(s)_	Kenaga, Wuyo	heck		
Date 4 / 26 / 84	TIME 11:30 am	PHOTOGRAPH	NUMBER			
BODY OF MATER Marsh es	st end of Hi-M	111 LOCATION	near outlet	under M-59	, 15' fr.	north shore
COUNTY Oakland	Mfg.	7ES 23	ne <u>H</u> 1	ghland		
REASON FOR SURVEY	Mill Mfg.		·			
	····					
VICINITY LAND USE: Most	ly Forest Mostly	Urban Mostl	y Agriculture	Other	···	
AVE. STREAM WIDTH marsh	AVE. STREAM DE	PTH 2.5 St	. VELOCITYO	ms	REAM km	
STREAM SHADING: Open	n Partly Open	Shaded ST	REAN TYPE:	oldwater	<u>Warmuster</u>	
WATER TEMP. 74° AI	R.TEIP65_*F	rEATHER: Sunny—P	artly Cloudy— Clo	udy-Rainy D	AM u/s: Tes	Nots
CHANNELIZED: Yes No	CHANNEL EROSION:	lone Slight -	Moderate — Se	vere HIG	H WATER MARK	6 im.
SECCHI DISC TRANS:	3 Se TURBIDITY:	Clear Slightly	Turbid — Turbid	— Opaque	HATER COLOR_1	ight brown
MATER ODORS: Norma	Sewage	Petroleum	Chemica	il Ozh	er	·
SURFACE DILS: Nor	ne Slick	Sheen ·	Globs	fle	cks	
SEDIMENT ODORS: Norm	-	Petroleum		Anaerobic	Other	
SEDIMENT OILS: Abser	<u>nt</u> S119	ht Mode	rate	Profuse		
DEPOSITS: \$1udg	e Sawdust	Paperfiber	Sand Re1	ict Shells	Other	
ARE THE UNDERSIDES OF STOR	ES WHICH ARE NOT DEE	PLY IMBEDOED IN S	UBSTRATE BLACK?	YES	MO	
FLOW						
SUBSTRATE VELOCITY TYPE m/sec	CHARACTERISTIC OR SIZE				ACTERISTICS DR SIZE	PERCENT IN SAMPLING AREA
BOULDERS" >1.2 (>3 fps)	256 mm (10") dia.	•	CLAY	Slick te	kture	
RUBBLE* >0.6	64-256 mm (2.1-10	") dia.	HARL	Grey, sh	ell fragments	
(>2 fps)				•		•
GRAVEL* >0.3 (>1 fps)	2-64 mm (0.1-2.5°)	dia.	DETRI	TUS Sticks, v plant mai	mod, coarse terials	7.
SAND >0.2	0.06-2.00 mm dia.	•	FIBRO	JS Partially	decomposed	
(>0.7 fps)	Gritty texture		PEAT	plant mai	erial	
SILT >0.12 (>0.4 fps)	0.004-0.006 mm dia	• . ′	PUL PY PEAT	Finely di material,	vided plant parts	10
MUCK-MUD >0.12	black, very find o	roanic	20	indisting	prishable	
(-0.4 fps)	2.50m, 15m, 15m, 5		LOGS I	STICKS		
* IMBEDDEDNESS: 0 = NONE	1 - 1/3 OR LESS	2 - 2/3 CR HORE	}}			•
BIOTA:						
PHYTOPLANKTON -0	-123	4 SL	IMES	(6) I	2 3	4
PERIPHYTON 0	1 ② 3	4 20	OPLANKTON	0 1	z (3)	4
FILAMENTOUS ALGAE D	1 ② 3	4 144	CROINVERTEBRATES	0 1	② 3	4
MACROPHYTES 0	1 ② 3	4 FI	SH	0 1	2 3	4
	<u>-</u> .		none seen			
G - Apsent 1 -	Sparse	2 - Moderate	J - Abun		4 - Pro	fuse

GAME FISH

ROUGH FISH

FORAGE FISH

AQUATIC PLANTS

Typha

PERIPHYTON Elodea

FILAMENTOUS ALGAE

periphyton or algae coats everything in this area

MACROPHYTES

Scirpus Lemna minor Potamogeton

STREAMBANK VEGETATION:

GRASSES

BRUSH

HERBACEOUS

CONIFERS

DECIDUOUS

BARREN

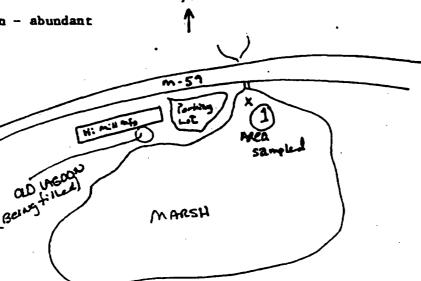
OTHER

MACROBENTHOS QUALITATIVE SAMPLE CHECK LIST (INDICATE DOMINANT GROUPS)

SPONGES	DRAGONFL JES	RATTAILED MAGGOTS
HYDRA	DAMSELFL JES	MIDGES C-A
FLATWORMS	TRUE BUGS	STONEFLIES
ROUNDHORMS	BEETLES	MAYFLIES
LEECHES	AQUATIC CATTERPILLARS	-BURROWERS
WATER MITES	ALDERFLIES	-SWIMMERS
SOMBUGS	HELLGRAMITES	-CLINGERS, SPRAWLERS
SCUDS	CRANEFL 1ES	CADDISFLIES
CRAYF ISH	NO-SEE-UMS	-FREE LIVING
SMAILS-LIMPETS	BLACKFL IES	-PURSE CASE MAKERS
CLAMS	DEERFLIES	-TUBE CASE MAKERS
AQUATIC EARTHWORMS	MOSQUITOES	-SADOLECASE MAKERS
<u> </u>	SNIPEFLIES	-NET SPINNERS OR RETREATMAKERS

NOTES, ETC.

Zooplankton - abundant



Station Number 2	Investigat	or(s) Kenage	a, Wuycheck		
	TIME 12:30 PHOT				
BODY OF WATER marsh SE	of Hi-Mill Mfg. LOCATI	ON SE of Hi-	-Mill near out	let from old	lagoons
COUNTY Oakland	13N R7ES	Highland T	`MP		
REASON FOR SURVEY H1-1	ull Mfg.				
VICINITY LAND USE: Mostly	Forest Mostly Urban	Mostly Agricul	ture Other		·
AVE. STREAM WIDTH marsh	AVE. STREAM DEPTH 2	.5 Se VELOCIT	y <u> </u>	STREAM km	
STREAM SHADING: Open	Partly Open Shaded	STREAM TYPE	: Coldwater	<u> Varmeter</u>	
MATER TEMP. 74 .E AIR	TEMP. 65. WEATHER: S	unny— <u>Partly Clo</u>	udy - Cloudy - Rainy	DAM u/s: Yes	No ks
CHAMMELIZED: Yes No	CHANNEL EROSION: None - SI	ight — Moderat	e — Severe	HIGH MATER MARK_	6 <u>1</u> -co
SECCHI DISC TRANS:	3 €t.TURBIDITY: Clear—S	lightly Turbid —	Turbid — Opaque	HATER COLOR	
WATER ODORS: Morma	Sewage Pet	roleum	Chemical	Other	
SURFACE OILS: None	Slick	Sheen	Globs	Flecks	• •
SEDIMENT ODORS: Normal	Sewage Petrole	um Chemic	al Anaerol	oic Other	
SEDIMENT OILS: Absent	•		Profi		
	- : Sawdust Paperfiber	-		•	
	S WHICH ARE NOT DEEPLY IMBEDO				
SUBSTRATE YELOCITY TYPE m/sec	CHARACTERISTICS OR SIZE	PERCENT IN SAMPLING AREA	SUBSTRATE C	HARACTERISTICS OR SIZE	
BOULDERS* >1.2 (>3 fps)	256 mm (10") dia.		CLAY Slick	texture	
>0.6 (>2 fps)	64-256 m (2.1-10") dia.		MARL Grey.	shell fragments	·
SRAVEL*	2-64 em (0.1-2.5") dia.	-		s, wood, coarse materials	70
SAND >0.2 (>0.7 fps)	0.06-2.00 mm dia. Gritty texture			ally decomposed material	
>0.12 (>0.4 fps)	0.004-0.006 mm d1a.		PEAT mater	y divideJ plant ial, parts tinquishable	. 10
MUCK-MUD +0.12 (+0.4 fps)	black, very find organic	20	LUGS & STICKS	t indu (2040 le	
* IMBEDDEDNESS: 0 * NONE	1 - 1/3 0A LESS 2 - 2/3 C	R MORE			
			<u> </u>		
BIOTA:				·	
PHYTOPLANKTON 8	1 2 3 4	SLIMES		1 2 3	4
PERIPHYTON 0	1 (2) 3 4	ZOOPLANKTON	ı 0	2 (3)	4 .
FILAMENTOUS ALGAE 0	1 ② 3 4	MACROINVERT		(a)	4
MACROPHYTES 0	1 (2) 3 4	FISH	0	1 2 3	4
			none seen		•
C - Aprent 1 - S	parse 2 - Modera	ite	3 - Abundant	4 - Pro	fase

CLAMS

AQUATIC EARTHWORMS

GAME FISH

ROUGH FISH

FORAGE FISH

QUATIC PLANTS PERIPHYTON		FILAMENTOUS ALGAE
MACROPHYTES Typha Lems minor	Elodea Potamogeton	Periphyton and/or filamentous alga- covered everything in this area.
STREAMBANK VEGETATION: <u>GRASSES</u>	BRUSH HERBACEOUS CONIFER	IS <u>DECIDUO</u> US BARREN OTHER
MACROBENTHOS QUALITATIVE S	AMPLE CHECK LIST (INDICATE DOMINANT GRO	
SPONGES	DRAGONFLIES	RATTAILED MAGGOTS
HYDRA	DAMSELFLIES	MIDGES C-A
FLATWORMS	TRUE BUGS	STONEFLIES
ROUNDWORMS	BEETLES	MAYFLIES
LEECHES	AQUATIC CATTERPILLARS	-BURROWERS
	ALDERFLIES	-SWIMMERS
WATER MITES		
NATER MITES SOUBLIGS	HELLGRAMITES	-CL INGERS, SPRANLERS
	HELL GRAMITES CRANEFL IES	-CL INGERS, SPRANLERS CADDISFLIES
SOMBUGS		

-TUBE CASE MAKERS

-SADOLECASE MAKERS

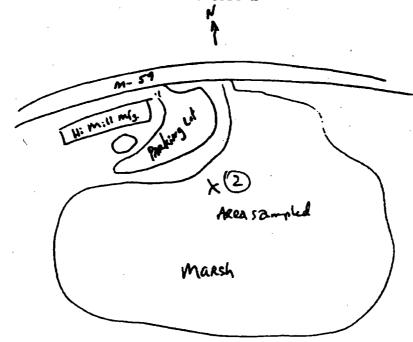
-NET SPINNERS OR RETREATMAKERS

MOTES, ETC. Zooplankton - Abundant in water column

DEERFLIES

MOSQUITOES

SNIPEFL IES



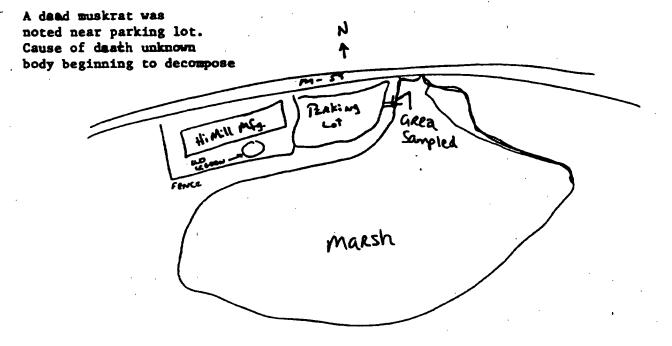
Station Number	3			Investiga	tor(s) <u>Kena</u>	ga, Wuy	check			<u> </u>		
Date 4/26/8 Roof and Parks	34 TI	to ma	1:00 rsh SE	of LOCAT	TOGRAPH MIMBER Mill Mfg.	pipe at	east	edge	of pa	rkin	g lot	
COUNTY Oakland	~											,
REASON FOR SURVEY	<u> H1-M</u>	<u>111 Mf</u>	R. Co.									
						_====						
VICINITY LAND USE:	-											
AVE. STREAM WIDTH	6 :	in ave.	STREAM D	EPTH	1 to VELOC	ITY <u><0</u>	.4 £ps	ST	REAM km		·	
STREAM SHADING:	Open	Partly	Open	Shaded	STREAM TY	PE: Co	ldwater	1	iarma ter	<u>-</u>		
WATER TEMP	C AIR TE	MP. <u>65</u>	£	WEATHER:	Sunny—Partly C	loudy - Clou	idy— Ra i	ny D	M u/s:	Yes	<u>***</u>	ka
CHANNELIZED: Yes	No CH	ANNEL ER	OS 10N:	None — S	light — Modera	ite — Sei	rere	HIG	H WATER I	MARK_		<u>6</u> ±
SECCHI DISC TRANS:_		_m TU	RBIDITY:	Clear_	Slightly Turbid	— Turbid –	- Obsdns	· •	ATER COL	.OR		
WATER ODORS:	Norma)		Sewage						er			
SURFACE OILS:	None		Slick		Sheen	Globs		Flee	:ks			
SEDIMENT ODORS:	Norma1	s	ewage	Petrol	eum Chemi	ical	Anae	robic	Othe	er		
SEDIMENT OILS:					Moderate			ofuse				
DEPOSITS:	Studge	Saud	ust	Paperfibe	r Sand	Re11	ct Shell	ls	Other_			
ARE THE UNDERSIDES C	OF STONES	WHICH AR	E NOT DE	EPLY IMBED	DED IN SUBSTRATE	BLACK?	1	rES		10_		
SUBSTRATE VELOCI TYPE m/sec	TY		CTERISTI R SIZE		PERCENT IN SAMPLING AREA	SUBSTA			CTERISTI OR SIZE			ENT IN NG AREA
BOULDERS* >1.2	? 2: os)	56 mm (10") dia	•		CLAY	S 11	ck tex	ture		•	
RUBBLE* >0.6	i 6- os)	4-256 m	(2.1-10	D") dia.		MARL	6ra	y, she	ll fragm	entis		
GRAVEL* >0.3	3 2- is)	-64 cm (0.1-2.5) dia.		DETRIT			ood, coa erials	rse		70
SAND >0.2 (>0.7 f	(.06-2.00 ritty te			,	FIBROU PEAT		tially nt mat	decompo erial	sed		
SILT >0.1 (>0.4 f		.004-0.0	06 mm dia	.		PULPY	mat	erial,	lq Lebiv Parts Sidenziu		,	10
MUCK-MUD +0.1		lack, ve	ry find :	organic	10	LOGS &	STICKS					
- IMBEDDEDHESS: 0 =	NONE 1	- 1/3 0	a ress	2 • 2/3	CR MORE							
							-					
BIOTA:	•						 ~			•	•	
PHYTOPLANKTON	_	•	2 3	4	SLIMES		9	1	2	3	4	
PERIPHYTON	0	1	§ 3	4	ZOOPLANKT	ON .	<u>ම</u>	1 .	2	3	4	
FILAMENTOUS ALGAE	0	1 (i) 3	4	MACROINVE	RTEBRATES	6	1	2	3	4	
MACROPHYTES	<u></u>	1	2 3	4	FISH		(6)	1	2	3	4	

ROUGH FISH

FORAGE FISH - one dead mud minnow near parking lot runoff site

AQUATIC PLANTS		PERIPHYT	CR ·		FILAMENTOUS ALGA	
MACROPHYTES	·	•				
STREAMBANK VEGETATION: GRASSES	BRUSH	HERBACEOUS	CONIFERS	DECTOUOUS	BARREN	OTHER
MACROBENTHOS QUALITATI	VE SAMPLE CHECK	LIST (INDICATE DO	MINANT GROUPS)			
SPORGES	·	DRAGONFLIES		RA	TTAILED MAGGOTS	
HYDRA		DAMSELFL 1ES		MI	DGES	
FLATWORMS		TRUE BUGS		ST	ONEFL IES	
ROUNDWORMS		BEETLES		MA	YFL IES	
LEECHES		AQUATIC CATTERP	ILLARS		-BURROWERS	
WATER MITES		ALDERFL IES			-SWIMMERS	
SOMBUGS		HELLGRAMITES			-CL INGERS, SPRAV	LERS
scubs		CRANEFLIES		CA	DDISFLIES	
CRAYFISH		NO-SEE-UMS			-FREE LIVING	
SNAILS-LIMPETS		BLACKFL IES			-PURSE CASE MAKE	RS
CLAMS		DEERFL IES			-TUBE CASE MAKER	
AQUATIC EARTHWORMS		MOSQUITOES			-SADDLECASE MAKE	
		SMIPFELIES			-NET SPINNERS OF	

MOTES, ETC. No macroinvertebrates in small trickel



ROUGH FISH

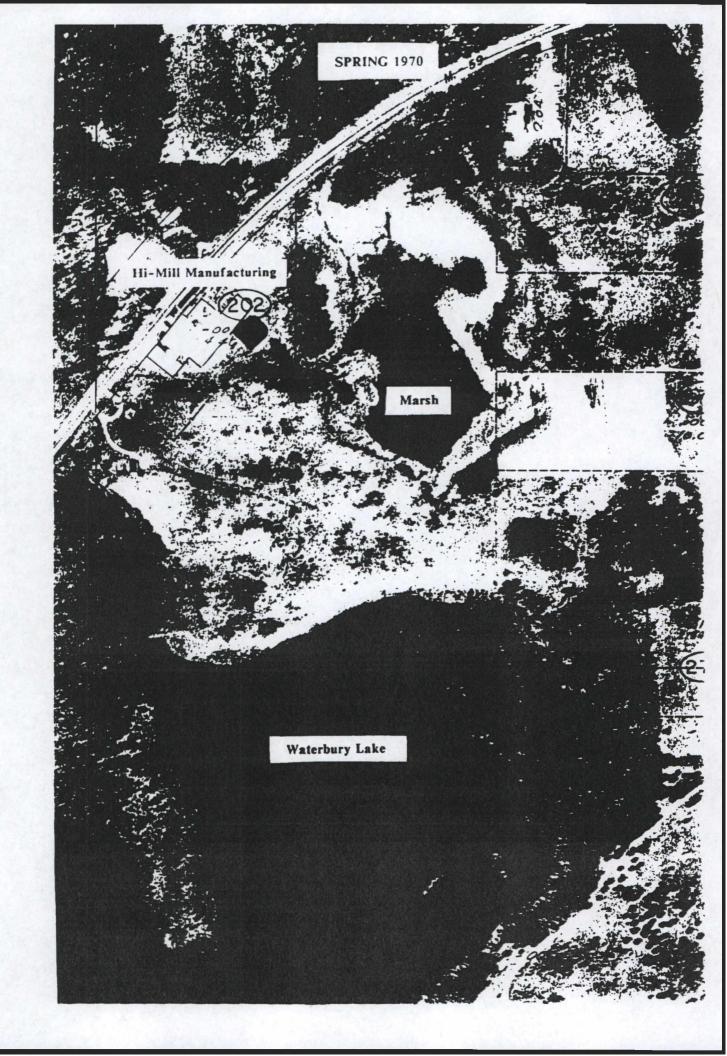
FORAGE FISH

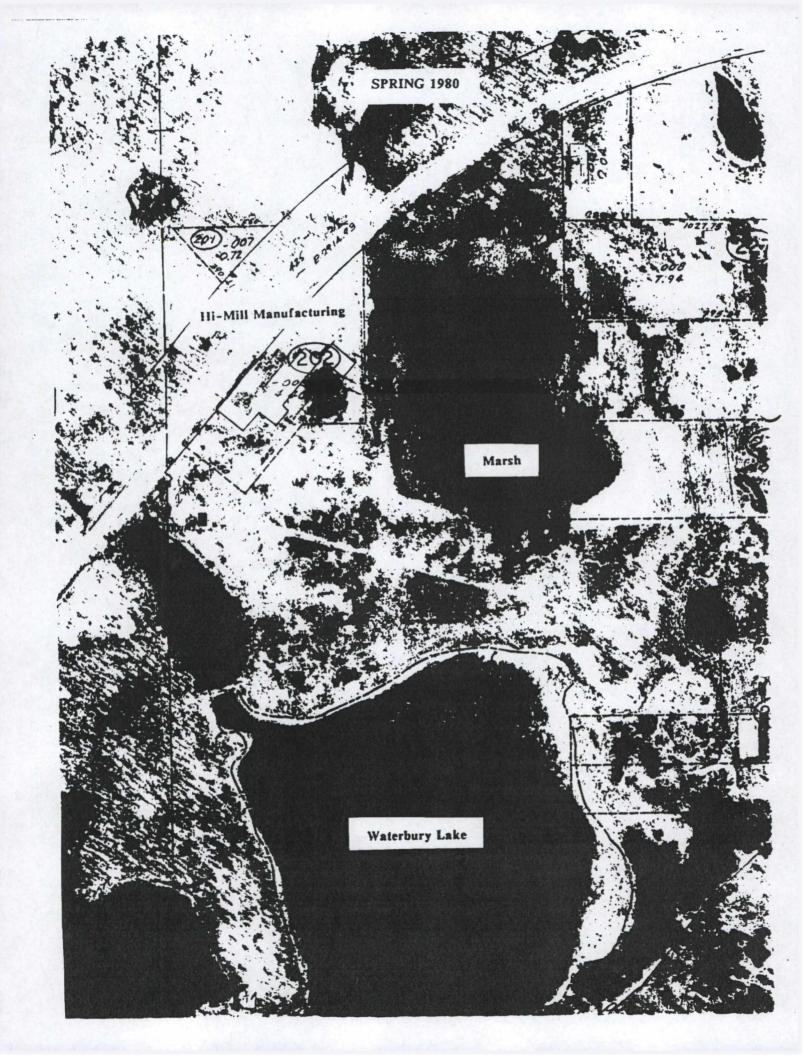
- minnows noted in shallow areas

PERIPHYTON FILAMENTOUS ALGAE AQUATIC PLANTS Scirpus. Potamogeton Typha Nuphar MACROPHYTES Chaga Nymphea STREAMBANK BRUSH GRASSES **HERBACEOUS** CONIFERS **DECIDUOUS** BARREN VEGETATION: OTHER MACROBENTHOS QUALITATIVE SAMPLE CHECK LIST (INDICATE DOMINANT GROUPS) DRAGONFLIES RATTAILED MAGGOTS SPONGES DAMSELFLIES MIDGES HYDRA TRUE BUGS STONEFL 1ES FLATWORMS BEETLES MAYFL IES ROUNDHORMS -BURROWERS AQUATIC CATTERPILLARS LEECHES -SWIMMERS HATER MITES ALDERFL IES HELLGRAMITES -CLINGERS, SPRAILERS SOMBUGS CADDISFL IES CRANEFL IES SCUOS -FREE LIVING CRAYFISH MO-SEE-UMS BLACKFL IES -PURSE CASE MAKERS SMAILS-LIMPETS DEERFLIES -TUBE CASE MAKERS CLAMS MOSQUITOES -SADDLECASE MAKERS AQUATIC EARTHMORMS SNIPEFL IES -NET SPINNERS OR RETREATMAKERS NOTES, ETC. m-59 Hi MILL MCA Tuca marsh 京三 X T weeds! HIGH GROUND

Canadan Mumban	£.	Investigator/s) Kenaga Unya	heck	
**	84 TIME 2:00				
					
				MIAND	
KEASON FOR SORVEY					
VICINITY LAND USE:	Mostly Forest Me				
,	 		•	ms STREAM km	
	Open Partly Open				·
				dy— Rainy DAM u/s: Yes	No b
		 -	 _	ere HIGH WATER MARK	
				Opaque LIATER COLOR_	
	Normal Sewas				
		Sheen			
JURPACE UIES.					
SEDIMENT ODORS:	Normal Sewage	Petroleum	Chemica 1	Anaerobic Other	
	Absent			Profuse	
	Sludge Sawdust			ct Shells Other	
	OF STONES WHICH ARE NOT			•	
	ITY CHARACTER			TE CHARACTERISTICS	
TYPE m/sec	c OR SIZ	E SAMP	LING AREA TYPE	OK SIZE	SAMPLING AREA
BOULDERS* >1.2	2 256 mm (10°) ps)	dia.	CLAY	Slick texture	
RUBBLE* >0.0	6 64-256 mm (2. ps)	1-10") dia.	HARL	Grey, shell fragments	
GRAYEL* >0.:	3 2-64 mm (0.1-2 ps)	.5") dia.	DETRITU	S Sticks, wood, coarse plant materials	60
SAND >0.2		ia.	FIBROUS	Partially decomposed	
(>0.7	2 0.06-2.00 mm d fps) Gritty texture	!	PEAT	plant material	
	fps) Gritty texture 0.004-0.006 mm		PEAT PULPY PEAT	plant material Finely divided plant material, parts	· 20
(>0.7 SILT >0.1 (>0.4 f) MUCK-MUD >0.1	fps) Gritty texture 12 0.004-0.006 m fps) 12 black, very ff	dis.	PEAT	plant material Finely divided plant material, parts indistinguishable	· 20
(>0.7 silt >0.7 silt (>0.4 silt)	fps) Gritty texture 12 0.004-0.006 mm fps) 12 black, very fi fps)	dia.	PEAT PULPY PEAT 20 LUGS. 8	plant material Finely divided plant material, parts indistinguishable	· 20
(>0.7 (>0.7 (>0.7 (>0.4 (>0.4 (>0.4 (>0.4 (>0.4 (fps) Gritty texture 12 0.004-0.006 mm fps) 12 black, very fi fps)	dia.	PEAT PULPY PEAT 20 LUGS. 8	plant material Finely divided plant material, parts indistinguishable	20
(>0.7 SILT	fps) Gritty texture 12 0.004-0.006 mm fps) 12 black, very fi fps)	dia.	PEAT PULPY PEAT 20 LUGS. 8	plant material Finely divided plant material, parts indistinguishable	20
(>0.7 SILT	fps) Gritty texture 12	nd organic S Z = 2/3 CR MOR	PEAT PULPY PEAT 20 LUGS. &	plant material Finely divided plant material, parts indistinguishable STICKS	20
(>0.7 SILT >0. (>0.4 SILT)0.4 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.6 SILT >0.7 SILT >0.6	fps) Gritty texture 12	nd organic S 2 = 2/3 CR MOR	20 LUGS. &	plant material Finely divided plant material, parts indistinguishable STICKS	4
(>0.7 SILT >0.7 (>0.4 MUCK-MUD >0.6 (>0.4 *IMBEDDEDNESS: 0 = BIOTA: PHYTOPLANKTON PERIPHYTON	fps) Gritty texture 12	nd organic S Z = 2/3 CR MOR 3 4 3 4	20 LUGS. & SLIMES ZOOPLANKTON	plant material Finely divided plant material, parts indistinguishable STICKS	4
(>0.7 SILT >0. (>0.4 MUCK-MUD >0. (>0.4 *IMBEDDEDNESS: 0 = BIOTA: PHYTOPLANKTON PERIPHYTON FILAMENTOUS ALGAE	fps) Gritty texture 12	nd organic S 2 = 2/3 CR MOR	20 LUGS & SLIMES ZOOPLANKTON MACROINVERTEBRATES	plant material Finely divided plant material, parts indistinguishable STICKS 0 1 2 3 0 1 2 3	4 4
(>0.7 SILT >0.7 (>0.4 MUCK-MUD >0.6 (>0.4 *IMBEDDEDNESS: 0 = BIOTA: PHYTOPLANKTON PERIPHYTON	fps) Gritty texture 12	nd organic S Z = 2/3 CR MOR 3 4 3 4	20 LUGS. & SLIMES ZOOPLANKTON	plant material Finely divided plant material, parts indistinguishable STICKS	4 4 4

APPENDIX I
AERIAL PHOTOGRAPHS





APPENDIX J

1983 MDNR LETTER - LAGOON CLOSURE (REF. 7)

MATRIMAL RESOURCES COMMISSION

JACOB A HOEPER E M LAITALA HILARY F SMELL PAUL H WENDLER HARRY M WENDLER



James J. Blanchard, Governor

Groundwater Quality Division
Detroit District Office
1120 S. State Fair Ave.
Detroit, HI 48203

(313) 368-3335

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON SUILDING SOX 30828 LANSING, Mr 48800 HOWARD A. TANNER, Ovector

September 8, 1983

Bob Beard HiMill Manufacturing Co. 1704 Highland Road Highland, MI 48031

SUBJECT: Filling in Lagoon and DNR Hydrogeological Study File #630375

Dear Mr. Beard:

I would like to take this opportunity to summarize our conversations of the past few weeks, including 9/6/83. You have requested permission to fill in your lagoon, with inert material, which has not been used for approximately 3 years and is currently at its driest level. As per our discussion you stated you have been seeking a licensed company to analyze the lagoon sludge, remove and properly dispose of it. I recommend in so doing that all the sludge and soil be removed to the underlying clay layer. I requested that our office receive a copy of the sludge analysis along with the determination as to whether it is classified hazardous or non-hazardous in accordance with Act 64 and RCRA definition. I also requested that our office be made aware of the intended disposal site. My supervisor has requested that a member of our staff be allowed to inspect the lagoon after sludge/contaminated soil removal, prior to filling.

What our office proposes is some further study into the extent of any groundwater contamination. As discussed samples will be taken, Tuesday, September 13, 1983, of the groundwater at points noted in the hydrogeological study. This will give us a more recent "look" at the situation. Subsequent samples will then be required after the sludge removal. These will be compared to the original to assure that contamination removal was complete.

At any time after our inspection of the sludge removal, you are free to fill in the lagoon. However, I must advise you that if further studies show that additional contamination exists the department may require you to re-excavate it. We sincerely hope that removal of the sludge and contaminated soil will resolve any groundwater contamination problem.

Enclosed is a copy of the hydrogeological study done by the DNR Water Quality Division compiled August 31, 1982. If you have any questions, please do not hesitate

to call.

Sincerely,

Lynne King

GROUNDWATER QUALITY DIVISION

LK:pf

cc: Dave Dennis H. Shakir

DETROIT DISTRICT OFFICE

Frank Belobraidich

APPENDIX K

SITE DESCRIPTION/EXECUTIVE SUMMARY - 1984 (REF. 8)

SITE DESCRIPTION/EXECUTIVE SUMMARY

Site Name: <u>Hi Mill Manufac</u> Street Number &		_ County: Oakland Michigan Code Number: 63-03N-07E-23AB DNR District: Detroit			
1074 Highland F	acad	EPA ID Number:			
City: Highland	 	<u>-</u>			
State: Michigan	Zip Code: 48031	SAS Score/Screen No.: 178			

From 1946, when operations began, to approximately 1981 the company discharged process water to an unlined holding pond. When this practice ceased they began disposing of the water (containing metals) by spray evaporation around the pond area. This practice ceased in November 1983, and disposal now is handled by a licensed waste hauler.

At various times the pond overflowed into a marsh east of the site. Although the marsh is near a large lake, there is no surface water connection between the two. However, groundwater contamination is known, and samples of lake waters have contained metals. Contamination of the water and sediments in the marsh is also known.

Sludges and sediments in the pond have been removed down to clay, and the hole filled in which "clean " fill. This operation has been supervised by the DNR, Hazardous Waste Division (Lynn King).

The company fabricates tubular aluminum and copper parts. It is located in the Highland Recreation area, about 1.5 miles east of Highland (population less than 1000), 1980 census).

Date of Previous Summary: 8/13/84 Previous Author: Current Date: 10/11/84
Author: Lonnie Lee

Site Assessment Unit Groundwater Quality Division Michigan Dept. of Natural Resources APPENDIX L

TECHNA CORPORATION RESUMES

Ph.D., Organic Chemistry, The University of Texas, 1975 B.A., Chemistry, Rice University, 1970

EXPERIENCE

* Summary

President, Techna Corporation	1986 - Date
Principal, Quantum Consultants	1985 - 1986
President, Environmental Research Group, Inc.	1984 - 1985
Program Manger, Radian Corporation	1982 - 1984
Department Head, Radian Corporation	1981 - 1982
Group Leader, Radian Corporation	1979 - 1 98 1
Staff Scientist, Radian Corporation	1976 - 1979
Laboratory Design Consultant (part time)	1980 - 1983

* Techna Corporation, Ann Arbor, Michigan

President and senior technical manager of a company providing research and regulatory compliance services in all areas of environmental, hazardous waste, and hazardous chemicals activities. Projects have included oil spill decontamination and remediation, development of hazardous waste management programs, waste characterization and disposal, hazard communication programs, site contamination assessment and remedial action planning, industrial effluent analysis and management programs, and environmental audits. A large environmental chemistry laboratory was designed for the U.S. Army Corps of Engineers.

* Quantum Consultants, Ann Arbor, Michigan

Principal and senior project/technical manager providing technical services in the areas of hazardous waste management, hazardous chemicals management and environmental regulations compliance. Projects included environmental and safety audits, waste management programs, groundwater and effluent sampling and analysis, assessments of chemically contaminated plant sites, development of hazard communication compliance and training programs, and design of a pharmaceutical manufacturing facility.

* Environmental Research Group, Inc., Ann Arbor, Michigan

Activities as President and Chief Operating Officer included corporate and senior technical management for a technical consulting company (environmental, industrial hygiene, hazardous waste, and chemical analysis services) comprised of 120 staff members in five nationwide locations. Technical activities included project design and management in the areas of hazardous waste management, analytical chemistry, waste site investigation, water pollution control, and chemical health and safety. Projects included assessments of chemically contaminated sites, development of efficient chemical analysis programs for groundwater and

effluent monitoring projects, air and wastewater permit support, wastewater treatment system evaluations, development of hazardous waste management and delisiting programs, and industrial hygiene surveys.

* Radian Corporation, Austin, Texas

Management and technical responsibilities included new business development, marketing, and design and management of projects ranging in size from \$10,000 to \$5 million. Business/technical areas of responsibility included hazardous waste programs, hazardous materials management and safety, analytical chemistry, data management, specialty chemical products, and pharmaceutical chemistry. Activities included design of quality assurance analytical standards programs for environmental analysis, development of chemical sampling and analysis procedures for environmental assessment of major industries, and development of hazardous materials handling facilities and safety programs. Other activities included hazardous waste site investigations, industrial hygiene surveys, chemical synthesis program development, and chemical analysis methods validations.

* Laboratory Design Consultant, Austin, Texas

The laboratory services and facilities of a major drinking water treatment facility were evaluated, a five-year expansion plan was developed, and a new 35,000 square foot laboratory and office complex was designed.

SPECIAL ACTIVITIES

Task Force for Scientific and Technical Assessments of Hazardous Waste Management, U.S. Intergovernmental Science, Engineering and Technology Advisory Panel, Washington, D.C., 1979.

Resource, Conservation and Recovery Act (RCRA) Task Force, American Chemical Society-Joint Committees, Washington, D.C., 1982 - present.

Small Quantity Generator Education Advisory Panel, Waste Systems Institute of Michigan, Inc./Michigan Department of Natural Resources, Lansing, Michigan, 1986 - present.

Symposium Organizer and Chair, American Chemical Society Annual Meetings:

- "Safety Concerns at Hazardous Waste Sites", Kansas City, Missouri, September, 1982.
- "Hazardous Materials Safety in the Chemistry Laboratory", St. Louis, Missouri, April, 1984.

Exposition Planning and Coordinating Committee, "Laboratory of the Future," Scientific Apparatus Manufacturers Association, 1983 - 1984.

Community Forum on Managing Small Quantities of Hazardous Waste, Washtenaw County, Michigan, 1986 - Present.

AFFILIATIONS

American Chemical Society, American Association for the Advancement of Science, American Society for Testing and Materials.

JAMES M. HARLESS, Ph.D.

PUBLICATIONS

- Cantrell, T.S., J.M. Harless and B.L. Strasser, "The Acetylation of Cyclononene," <u>J. Org. Chem.</u>, 36, 1191 (1971).
- Harless, J.M. and S.A. Monti, "Tricyclo[3.1.1.0^{3,6}]heptan-6- carboxylic Acid," <u>J. Amer. Chem. Soc.</u>, 94, 4714 (1974).
- Monti, S.A. and J.M. Harless, "Synthesis of Tricyclo-[3.1.1.0^{3,6}]heptan-6-yl Derivatives," <u>J. Amer. Chem. Soc.</u>, 99, 2690 (1977).
- Harless, J.M., K.E. Baxter, L.H. Keith and D.B. Walters, "Design and Operation of a Hazardous Materials Laboratory," in <u>Safe Handling of Chemical Carcinogens</u>, <u>Mutagens and Teratogens</u>, D.B. Walters, ed. (Ann Arbor Press, Ann Arbor, MI) 1981.
- Keith, L.H., D.B. Walters and J.M. Harless, "Analysis and Storage of Hazardous Environmental Chemicals for Toxicological Testing," in <u>The Chemistry of Environmental Agents as Potential Health Hazards</u>, J.M. McKinney, ed. (Ann Arbor Press, Ann Arbor, MI) 1981.
- Walters, D.B., L.H. Keith, J.M. Harless and J.T. Ward, "Chemical Selection and Handling Aspects of Large-Scale Toxicological Testing: An Overview," in <u>The Chemistry of Environmental Agents as Potential Health Hazards</u>, J.M. McKinney, ed. (Ann Arbor Press, Ann Arbor, MI) 1981.
- Harless, J.M., et al., <u>RCRA and Laboratories</u>, (American Chemical Society Press, Washington, D.C.) 1983.
- Harless, J.M., "Chemical Waste Management in Academic Laboratories," The pHilter, 16, 1 (1983).
- Harless, J.M., "Components in the Design of a Hazardous Chemicals Handling Facility," in <u>Health</u> and <u>Safety for Toxicity Testing</u>, D.B. Walters and C.W. Jameson, eds. (Butterworth Publishers, Boston) 1984.
- Walters, D.B., J.M. Harless and R.S. Strickoff, "Chemical Containment: Criteria for Toxicity Testing Facilities," in <u>Health and Safety for Toxicity Testing</u>, D.B. Walters and C.W. Jameson, eds. (Butterworth Publishers, Boston) 1984.
- Harless, J.M., "Environmental Risk Assessment for Real Estate Transactions," Michigan Real Property Review, 14, 81 (1987).

PAPERS PRESENTED

- Harless, J.M., "Preliminary Results of Evaluations of the Level I Environmental Assessment Methods at a Coal Gasification Facility," Environmental Assessment Steering Committee, U.S. Environmental Protection Agency, Research Triangle Park, NC, March 13, 1978.
- Harless, J.M., K.E. Baxter, L.H. Keith and D.B. Walters, "Design and Operation of a Hazardous Materials Laboratory," Division of Chemical Health and Safety, American Chemical Society Annual Meeting, Washington, D.C., September 9-14, 1979.
- Harless, J.M., and R.L. Trammell, "Preparation of Quality Assurance Standards for Priority Pollutant Analyses, "Division of Environmental Chemistry, American Chemical Society Annual Meeting, New York, NY, August 24-27, 1981.
- Harless, J.M., "Design of a Hazardous Materials Laboratory, Part II," Division of Chemical Health and Safety, American Chemical Society Annual Meeting, New York, NY, August 24-27, 1981.
- Harless, J.M., and R.L. Trammell, "A Quality Assurance Program for Preparation of Priority Pollutant Analytical Standards," Division of Analytical Chemistry, American Chemical Society Annual Meeting, New York, NY, August 24-27, 1981.
- Harless, J.M., "Design Considerations for a Toxic Chemicals Handling Facility," Division of Chemical Health and Safety, American Chemical Society Annual Meeting, Las Vegas, NV, March 28-31, 1982.
- Harless, J.M., and A.W. Nichols, "Preparation of Quality Assurance Standards for Hazardous Waste Analyses, Part I," Division of Environmental Chemistry, American Chemical Society Annual Meeting, Las Vegas, NV, March 28-31, 1982.
- Harless, J.M., and A.W. Nichols, "Preparation of Quality Assurance Standards for Hazardous Waste Analyses, Part II," Division of Environmental Chemistry, American Chemical Society Annual Meeting, Las Vegas, NV, March 28-31, 1982.
- Harless, J.M., "A Laboratory Safety Program for Handling Hazardous Environmental Samples," Division of Chemical Health and Safety, American Chemical Society Annual Meeting, Kansas City, MO, September 13-17, 1982.
- Harless, J.M., et. al., "Design and Operation of an Automated Glove Permeation Testing System," American Industrial Hygiene Association Annual Conference, Philadelphia, PA, May 12, 1983.
- Harless, J.M., et. al., "Chemical Structure/Glove Permeation Relationships Developed from the NTP Glove Permeation Program," American Industrial Hygiene Association Annual Conference, Philadelphia, PA, May 12, 1983.
- Harless, J.M., "Hazard and Risk Assessment for Handling Toxic Chemicals," Division of Chemical Health and Safety, American Chemical Society Annual Meeting, St. Louis, MO, April 8-13, 1984.
- Harless, J.M., "Storage and Shipment of Hazardous Materials," Division of Chemical Health and Safety, American Chemical Society Annual Meeting, St. Louis, MO, April 8-13, 1984.
- Harless, J.M., "A Detailed Regulatory Overview of RCRA," Michigan Industrial Hazardous Waste Conference, Detroit, MI, May 13-15, 1985.

APPENDIX M

TECHNA CORPORATION REPRESENTATIVE PROJECTS

ASSESSMENT AND MANAGEMENT OF CHEMICALLY CONTAMINATED SITES

Groundwater Remedial Investigation/Feasibility Study

An extensive groundwater remedial investigation and feasibility study is underway at a large automotive manufacturing plant. Chlorinated solvents have been measured at environmentally significant levels in the groundwater under several areas of the plant. A major program has been implemented to determine the sources and migration patterns of the contamination. Activities include the installation and sampling of over twenty-five temporary and permanent monitoring wells in and around the plant buildings.

A feasibility study is also being implemented to determine the most cost effective method(s) to immediately limit the migration of contaminants and to ultimately remediate all zones of contamination.

Groundwater Assessment and Remedial Action Program

The groundwater beneath a large General Motors Corporation manufacturing plant was found to be contaminated with very high levels of chromium and sulfuric acid. Groundwater monitoring wells were installed to identify the source of the contamination and determine the leading edge of the contaminant plume.

A purge-well system was designed and installed to remove heavily contaminated groundwater and retard the migration of contaminants. The groundwater removed by the system is sent to an existing wastewater treatment plant for processing.

Site Assessment and Remedial Action

The plant site of a fiberglass products manufacturer was assessed for volatile solvents contamination after discovery of a major solvent spill and improper waste drum storage practices. An initial assessment defined the lateral spread of the spill and identified an area of suspected soils contamination near the drum storage area. The second phase of the project involved installation, sampling and analysis of groundwater monitoring wells and excavation of grossly contaminated soils.

Solvent contamination was discovered in the uppermost groundwater aquifer. However, preliminary risk assessments based upon data from the Centers for Disease Control, CERCLA, and MDNR risk assessment models indicate that the contaminant levels in the groundwater and remaining soils are below human effect thresholds. Discussions are being held with regulatory authorities concerning termination of remedial activities.

Site Assessment and Remedial Action

The plant site of a metal stripping and plating company was assessed for environmental contamination which might have resulted from improper raw material and hazardous waste storage practices. Over 170 drums of hazardous wastes were sampled, analyzed, transported from the site and properly disposed. Over 100 empty drums were also removed and disposed.

A comprehensive site sampling and analysis plan (organic and inorganic species) was developed and accepted by the Michigan Department of Natural Resources. Results showed elevated levels of chlorinated solvents and toxic metals in some surface soils at the site. A soils excavation and disposal program was implemented to remove all environmentally significant contaminants.

Oil Spill Remedial Action

An emergency remedial action program was developed and implemented in response to a spill of several hundred gallons of fuel oil into a construction excavation site at the University of Michigan. Approximately 7000 gallons of contaminated water and 70 cubic yards of contaminated soil were removed from a pit 20 feet deep. All materials were properly disposed.

Assessment of Contaminated Groundwater

After groundwater contamination was identified in a general site assessment program at a large automobile parts manufacturing plant, Techna was retained to determine the extent of contamination and evaluate the complex hydrogeological conditions at the site. Nine groundwater monitoring wells were installed and sampled for chlorinated organic solvent species. Groundwater elevation determinations indicated the potential for discontinuous flow directions resulting from localized groundwater mounding phenomena. However, evaluation of the chemical analysis results from samples collected from the selectively-placed monitoring wells revealed 1) the source of the contamination and 2) that the contaminant plume is moving according to regional groundwater flow and is not significantly impacted by the mounding effects.

The contaminant plume was partially delineated, and was found to be moving off-site toward a residential area. Additional investigations are in progress to determine the full extent of the plume and to develop sufficient data to perform a remedial action feasibility study.

Site Assessment and Remedial Action

An initial hazardous waste audit of a metal products manufacturer revealed the presence of several underground storage tanks containing waste cutting oils contaminated with chlorinated solvents. A large natural depression on the site was found to contain over 70 cubic yards of oil-soaked absorbent materials. A remedial action program to excavate and dispose of the tanks, underlying soils, and contaminated absorbent materials was immediately developed and implemented. Subsequent soils sampling and analysis revealed additional contamination with chlorinated solvents.

A groundwater assessment program is currently being implemented. Monitoring wells are being installed at several depths in the underlying fractured sandstone stratum to facilitate determination of contaminant migration potential.

Site Investigation and Feasibility Study for Closure of Part A Permitted Hazardous Waste Storage Facility

An 8000 square-foot, unlined drum storage area at a large General Motors Corporation manufacturing plant is being assessed as part of the Part A closure plan designed by Techna Corporation. Chemical analyses of initial subsurface samples revealed low levels of contamination by volatile solvents and toxic metals. A thorough subsurface investigation consisting of 27 soil borings and three groundwater monitoring wells is being implemented to determine the extent of contamination, to support development of a risk assessment model, and to provide data for a remedial action feasibility study.

Site Remedial Investigation/Feasibility Study

The site of a major drum recycling facility, which was visibly contaminated with organic materials, was assessed for its potential environmental impact. An extensive three dimensional sampling and analysis program was implemented. The results indicated that the contamination consisted primarily of high molecular weight oils and pigments, the site was underlain by a clay stratum, and there was no evidence of migration to groundwater.

A risk assessment and remedial action feasibility study was performed. The study concluded that appropriate remediation consisted of removal and disposal of surface soils, leaving the clay stratum intact.

Site Assessment

The site of a metalworking products manufacturer was investigated for environmental contamination resulting from improper management of effluents and wastes. The area was surveyed for soils contamination and the presence of buried drums, and soil profile borings were conducted to a depth of 25 feet. Soils and groundwater were sampled and analyzed for organic and inorganic contaminants. Remedial action programs to remove soils contaminated with oils were designed and executed with approval of the Michigan Department of Natural Resources.

Site Assessment

A portion of the plant site of a metal fabricating and coating company was investigated for potential environmental contamination from improper drum storage practices. The assessment involved soil and groundwater sampling and analysis for solvent and heavy metal species. No contamination was found, and all regulatory compliance orders were vacated.

HAZARDOUS WASTE MANAGEMENT

Hazardous Waste Management Program Support Services - General Motors Corporation

Techna is managing a year-long blanket contract to provide hazardous waste and other environmental management services to a large General Motors production facility. Specific projects include an inventory and re-characterization of plant waste streams, development of a drum management plan, effluent sampling and analysis, hazardous waste training programs, quality assurance inspections of hazardous waste transporters and disposal sites, and preparation of a comprehensive environmental regulations compliance program and written manual. Techna is also managing the closure of the plant's Part A permitted waste storage facilities and is performing contamination assessment and remedial action activities throughout the plant.

Hazardous Waste Disposal and Management Program - Metal Finisher

Over one hundred drums of waste chromic acid solutions and other hazardous wastes were sampled, analyzed, transported and disposed for a metal finishing and plating company. A comprehensive waste management program was then developed and implemented. The plan included construction of a proper waste storage area, development of waste handling procedures, and preparation of a contingency plan.

Hazardous Chemicals Management and Disposal - The Edison Institute

Chemical management services are being provided to the Edison Institute during the restoration of Thomas Edison's Menlo Park Laboratory in Greenfield Village. Chemical handling, personal protection, container restoration, and chemical disposal programs have been developed and are being managed. Approximately 3000 containers of hazardous and radioactive materials were cleaned and restored.

The 600 containers of waste chemicals generated from the restoration program are being consolidated and labpacked for disposal. Types of wastes being managed include flammables, corrosives, EP toxics, reactives, and listed wastes.

Laboratory Waste Management Services - Ford Motor Company

Packaging, transportation, and disposal management services were provided to Ford Motor Company research laboratories for the removal of over 600 containers of chemicals and chemical products. The chemical inventory contained flammable, toxic, corrosive, and reactive materials. Containers were segregated according to disposal method and site, and they were then labpacked. Four different licensed hazardous waste disposal sites were used.

<u>Development of Chemical Wastes and Process Effluent Management Programs - Plastics Molding</u> Company

Wastes and effluent management programs were developed for a large plastics molding and coating company in Georgia. Sludges and wastewater from paint spray booths were sampled and analyzed for organic and inorganic species and hazardous waste characteristics. Proper waste accumulation, storage, transportation and disposal programs and effluent treatment systems were developed.

Hazardous Waste Management Training Program - PetroChem Processing, Inc.

Techna Corporation is providing the hazardous waste management, hazard communication, and emergency response training for employees of PetroChem Processing, Inc., a hazardous wastes-to-fuels processing facility. The training program was developed jointly by Techna and client personnel and is presented in half-day sessions.

Hazardous Waste Management and Contingency Planning - Tool and Die Company

A hazardous waste management plan and a written contingency plan were developed for two plants of a large tool and die manufacturer. An emergency response and notification system was developed for both plants. A building was designed to house a zinc phosphating wastewater treatment plant, raw chemical materials, and hazardous wastes.

Hazardous Waste Management Services - Michigan State University

Techna's hazardous waste management division is currently managing the transportation and disposal of all hazardous wastes generated by Michigan State University. Waste materials include solvents, discarded reagents, maintenance wastes, and animal wastes. Environmental consulting services are also being provided. These include procedural guidance, waste segregation, lab pack construction, waste sampling and analysis, and disposal site approvals.

Hazardous Waste Management Services - General Motors Corporation

Small-quantity hazardous wastes generated at the Delco Products Division, Livonia Plant are being managed. Halogenated and non-halogenated solvents, painting and maintenance wastes, and miscellaneous industrial chemical wastes are being transported to a variety of disposal sites. Techna is also responsible for periodic characterizations of waste streams and for maintaining waste approvals at the selected disposal sites.

Hazardous Waste Management Services - Chrysler Corporation

Techna Corporation has provided laboratory waste management services to Chrysler's Research and Development Center. These services included the segregation, packaging, and transportation of large numbers of waste laboratory chemicals and chemical products. All types of hazardous wastes, including flammables, reactives, corrosives, explosives, and unknown materials, were handled. These materials were managed through a combination of lab packing and co-mingling techniques. Several disposal sites nationwide were selected to receive the various types of waste materials.

Hazardous Waste Management Services - Ford Motor Company

Small quantity waste management and transportation services have been provided to various Ford Motor Company production and assembly plants. All types of specialty, banned, reactive, solvent, and unknown waste materials have been packaged and transported for disposal. Waste characterization and disposal site selection services have also been provided.

Waste Management Services - Consumers Power Company

Techna Corporation's waste management division has managed the small-quantity and specialty wastes generated by the Consumers Power Company facilities in Michigan for the past three years. Drum quantities of hazardous and non-hazardous wastes from laboratory, maintenance and general operations have been transported for disposal. Regulatory compliance services have been provided to Consumers Power to develop proper collection, segregation, packaging, and disposal procedures for a wide variety of waste streams. Waste materials have also been sampled and analyzed to determine their characteristics prior to selection of a disposal method and site.

ENVIRONMENTAL REGULATORY COMPLIANCE

Contingency Planning - Tool and Die Company

Comprehensive environmental response contingency plans were developed for two plants operated by a large tool and die company. Operations covered by the plan included metal forming and machining areas, zinc phosphate treatment lines, and a large wastewater treatment plant. The written plans encompass the emergency preparedness requirements of the Clean Water Act (SPCC), federal and state hazardous waste regulations, SARA Title III, the Toxic Substances Control Act (PCBs), Michigan Act 245 (PIPP), and local wastewater districts.

Emergency response procedures were developed in cooperation with the plant Emergency Coordinator. Appropriate emergency response and personal protection equipment was specified and installed.

Contingency Planning - Air Cargo Company

A chemical management contingency plan was developed for a large air cargo company. The plan included detailed responses to environmental and other chemical discharge emergencies involving the company's operations, maintenance, and fuel storage facilities. Preparation of the plan involved the development of new emergency response and inspection/monitoring procedures for the facility. The written plan was developed for compliance with all applicable federal, state, and local requirements for documented contingency planning.

Air Permitting Support Services

Techna Corporation managed all air effluent permitting activities for a large steel products manufacturing facility. Engineering drawings and specifications for several particulate emission sources were evaluated, and emission rates were calculated. All air permit applications were prepared, and negotiations were conducted with the permitting agency to establish permit conditions. Permits were granted without requirements for routine source compliance sampling and analysis.

DOT Compliance and Corporate Safety Programs

A complete program for ensuring compliance with Department of Transportation regulations was developed for a hazardous and non-hazardous wastes transportation company. The program included the development of operations, safety, and recordkeeping procedures and the preparation of a comprehensive written compliance manual. A training program was developed and presented to the company's managers and drivers.

An extensive safety and emergency response program and written manual were also developed for the company. All employees were trained to understand and implement the philosophies and procedures described in the program.

Wastewater Management Program

Techna Corporation is conducting a wastewater disposal feasibility study for a large, specialty steel products manufacturing company. Renewal of the groundwater discharge permit for the company's acid pickling rinse waters was threatened on the basis of seemingly non-representative chemical analysis data which indicated violations of permit requirements. Techna conducted an extensive regulatory evaluation program and performed a wastewater sampling and analysis program to determine the time-composited average concentrations of regulated contaminants in the wastewater.

The baseline sampling and analysis program was designed to determine the suitability of the wastewater for both groundwater and sewer system discharges without pretreatment. Sufficient data was collected for evaluation of pretreatment options. A cost-effectiveness study is being conducted to determine the best long-term discharge option.

Wastewater Pretreatment Standards Compliance Support

An NPDES wastewater pretreatment standards compliance program was developed and implemented for the electroplating wastewater treatment system of a specialty metal products fabrication company. A six-day sampling and analysis program was conducted to collect the data necessary for preparation of a baseline monitoring report. When the results revealed that the wastewater contained metals in excess of permitted levels, Techna assisted the company in optimizing the operation and effectiveness of its wastewater treatment plant. A baseline monitoring report was prepared and submitted to the county wastewater management district.

Development of Chemical Wastes and Process Effluent Management Programs

Wastes and effluent management programs were developed for a large plastics molding and coating company in Georgia. Sludges and wastewater from paint spray booths were sampled and analyzed for organic and inorganic species and hazardous waste characteristics. Proper waste accumulation, storage, transportation and disposal programs and effluent treatment systems were developed.

Sampling and Analysis of Wastewater and Groundwater

The electroplating wastewater treatment plant effluent from a General Motors plant was sampled continuously over a six-day period using an automated compositing sampler. The effluent was analyzed for all Priority Pollutant species, phenol, and cyanide, and the data was evaluated for regulatory compliance reporting.

Groundwater samples were collected from 18 wells placed upgradient and downgradient from a French Drain aquifer control system at the plant. The samples were analyzed for metals content, and the data was evaluated against historical records.

Effluent Monitoring Program

All wastewater sampling, analysis, and reporting tasks for preparation of an Effluent Guidelines Pretreatment Standards Baseline Monitoring Report were performed for a metal stripping and finishing plant. Both time-proportional (autosampler) and grab sampling techniques were required because of the batch nature of discharges and the lack of consolidated wastewater flows. A wastewater collection and sampling manifold system was designed to facilitate the future sampling of the regulated streams.

Analysis of Wastewater and Groundwater

Techna is managing the wastewater and groundwater analysis program of a major printed circuit board manufacturer. Independent laboratory selection, analysis method selection, quality control, and data review, evaluation, and reporting services are being provided.

- Harless, J.M., "Impacts of Recent RCRA Changes on Hazardous Waste Generators," Michigan Industrial Hazardous Waste Conference, Detroit, MI, May 13-15, 1985.
- Harless, J.M., "Local Government Agency Interactions with Hazardous Waste Generators," Hazardous Waste Issues for Local Government Officials Conference, Ann Arbor, MI, June 27, 1985.
- Harless, J.M., "Chemical and Physical Analysis Requirements Under RCRA," Hazardous Waste Management Realities and Remedies Symposium, American Chemical Society Annual Meeting, Chicago, IL, September 8-13, 1985.
- Harless, J.M., "RCRA and CERCLA: Requirements, Realities and Society," Department of Engineering, Central Michigan University, October 21, 1985.
- Harless, J.M., "Management of Hazardous Wastes in Industrial Research Laboratories," Ford Motor Company, Scientific Research Laboratories, Dearborn, MI, January 15, 1987.
- Harless, J.M., "Environmental Audits for Hazardous Waste Management," Forging Industry Association Hazardous Waste Seminar, Chicago, IL, February 25, 1987.
- Harless, J.M., "Sewage Disposal of Chemical Wastes The Consultant's Liabilities," ACS Task Force on RCRA Symposium, American Chemical Society Annual Meeting, New Orleans, LA, August 30 September 4, 1987.
- Harless, J.M., "Hazard Determination for Hazard Communication," Symposium on Hazard Communication, American Chemical Society Midwest Regional Meeting, Wichita, KS, November 6, 1987.
- Harless, J.M., and E.A. Cieply, "Labpacking vs. Co-Mingling of Hazardous Wastes," Third Chemical Congress of North America, Toronto, Canada, June 5 10, 1988.
- Harless, J.M., and E.A. Cieply, "Management of Academic Laboratory Wastes Tips from a Transporter," Third Chemical Congress of North America, Toronto, Canada, June 5 10, 1988.

MISCELLANEOUS PRESENTATIONS

- Harless, J.M., "Computerized Management of Chemical Hazard Information," Laboratory Safety Short Course, American Chemical Society, Houston, TX, April 23, 1981.
- Harless, J.M., D.B. Walters, C.W. Jameson and W.B. Beranek, "Chemical Health Concerns," Health Fields, NBC Television, New York, NY, November, 1981.
- Harless, J.M., "Inside Environmental Consulting," <u>Inside the Environment</u>, WCBN, Ann Arbor, MI, September 14, 1984.
- Harless, J.M., "Industrial Hygienists as Consultants," School of Public Health, The University of Michigan, October 6,1985.
- Harless, J.M., "Environmental Risk Assessment for Real Estate Transactions," Commercial Lending Officer Seminar, Michigan National Bank Corporation, Troy, Michigan April 8, 1988.

PATENTS

Harless, J.M., et al., "Permeation Testing Apparatus," U.S. Patent No. 4,468,951, September 4, 1984.

CHARLES F. KOONS, P.E.

EDUCATION

M.S., Civil Engineering, State University of New York, In Progress B.S., Civil Engineering, State University of New York, 1975

EXPERIENCE

* Summary

Section Leader, Techna Corporation	1988 - Date
Project Manager, Granger Construction Company	1985 - 1988
Project Resident Engineer, McNamee Porter and Seeley	1982 - 1985
Resident Engineer, McNamee Porter and Seeley	1977 - 1982

* Techna Corporation, Ann Arbor, Michigan

Primary responsibilities as Senior Project Engineer and Site Assessment Section Leader include design and management of hazard waste permit support programs and site investigation and remediation projects. Specific project activities include preparation of facility contingency plans, preparation of RCRA Part B permit applications, and development and implementation of RCRA Part A facility closure plans. Other technical responsibilities include environmental assessments, environmental compliance and risk assessment audits, and hazardous waste management programs. Activities have included development of Part B permit applications for automotive and chemical production plants, development of Part A closure plans for multiple container storage and UST sites, and management of numerous site investigation and risk assessment programs.

* Granger Construction Company, Lansing, Michigan

Served as Project Manager for construction of the Kent County (Michigan) Solid Waste Recovery Facility (refuse incineration/co-generation) and the G. Robert Cotton Correctional Facility. Responsibilities included negotiating and administering subcontracts, preparing cost estimates, coordinating design professionals, expediting/coordinating engineering design drawings, equipment and materials, and directing field supervisors.

* McNamee Porter and Seeley, Ann Arbor, Michigan

Activities as Project Resident Engineer involved on-site contract administration during construction of the wastewater treatment plant for the city of Lapeer, Michigan. Specific

responsibilities included on-site representation of design engineers, supervision of inspection and testing personnel, maintenance of construction records, and management and review of contractor performance. Also supervised the installation, testing and start-up of all architectural, structural, mechanical, electrical and instrumental systems and sub-systems.

Responsibilities as Resident Engineer included design and construction management for major plant expansions of the Three Rivers Filtration Plant in Fort wayne, Indiana. Additions included pneumatic material conveying systems, chemical feed equipment and dual media high rate gravity filters. Other responsibilities and activities as Resident Engineer included design and management of sanitary sewer installations and construction of sewer system pump stations in Green Oak Township, Michigan.

CERTIFICATIONS

Registered Professional Engineer - Michigan #28225

Grade AT Water Works Operator Certificate - Indiana #803159

AFFILIATIONS

National Society of Professional Engineers

M.S., Chemistry, University of Michigan, 1986
B.A., Chemistry, Russian Studies, Randolph-Macon Woman's College, 1985

EXPERIENCE

* Summary

Chemist, Techna Corproation	1988 - Date
Chemistry/Math Teacher, Greenhills School	1986 - 1988
Instructor, University of Michigan	1985 - 1986
Research Assistant, Virginia Chemicals, Inc.	1984

* Techna Corporation, Ann Arbor, Michigan

Responsibilities as chemist in the Chemical Management Section of Techna include hazards evaluations and risk assessments, SARA, DOT, RCRA, and OSHA categorization on over three thousand hazardous chemicals for purposes of incorporation into ChemReg, Techna's chemical regulatory compliance database. Activities have included several asbestos/formaldehyde survey and risk assessments, in-plant chemical inventory development and management, environmental impairment resk assessments, and radioactivity surveys.

* Greenhills School, Ann Arbor, Michigan

Responsibilities as a chemistry and mathematics educator included standard teaching and preparation functions in chemistry, advanced chemistry, and algebra, as well as maintenance of laboratory equipment and chemical stockrooms. Activities included writing curriculums for new labs involving micro-technique.

* University of Michigan, Ann Arbor, Michigan

Responsibilities as a Chemistry Teaching Assistant included supervising general chemistry laboratories; leading recitation, discussion and problem-solving sessions; administering and grading written examinations.

* Virginia Chemicals, Portsmouth, Virginia

Responsibilities as a Research Assistant included developing new methods for quality control in the Analytical Research and Development Lab involving the use of capillary gas chromatography and atomic absorption spectrometry.

B.S.C.E., Lawrence Institute of Technology, 1982
Continuing Education
Borehole Geophysical Methods - NWWA
Groundwater Modeling - NWWA
Aquifer Restoration - NWWA
Groundwater Monitoring - NWWA
Geophysical Methods - NWWA
Safety At Hazardous Materials Sites - NWWA
Groundwater Monitoring - USEPA

EXPERIENCE

Summary

Project Engineer, Techna Corporation	1988 - Date
Project Engineer, McDowell & Associates	1984 - 1988
Quality Control Manager, Ajax Materials Corp.	1982 - 1984
Project Engineer, McDowell & Associates	1978 - 1982

* Techna Corporation, Ann Arbor, Michigan

Responsibilities as Project Engineer include design and implementation of site assessment programs consisting of site inspection, groundwater monitoring well design and installation, and collection of surface and sub-surface soil and groundwater samples for chemical analysis. Other activities include preparation of hydrogeological profiles, contaminant plume migration assessments, contaminated groundwater remediation design, environmental risk assessments for real estate transactions, and hazardous waste compliance programs.

* McDowell & Associates, Ferndale, Michigan

Responsibilities as Project Engineer included directing and planning geotechnical hydrogeological and hazardous waste site investigations. Specific activities included installation and monitoring of single and multi-level groundwater sampling devices, field testing of soil permeability, and the interpretation of field pump data. Other experience involved conducting on-site geophysical investigations and designing and developing a computer database to store, sort and retrieve over 80,000 pieces of data collected from over 4,000 soil boring logs.

* Ajax Materials Corporation, Madison Heights, Michigan

Duties included design, construction and management of laboratory facilities, as well as development and implementation of quality control/quality assurance procedures and programs as required by MDOT, FHWA, and FAA during the production of bituminous products.

B.S., Engineering Science, University of Michigan School of Engineering, 1983 B.S., Zoology, University of Michigan, 1973

EXPERIENCE

* Summary

Environmental Engineer, Techna Corporation	1986 - Date
Environmental Engineer, Roy F. Weston, Inc.	1985 - 1986
Associate Environmental Engineer, Environmental Research Group, Inc.	1984 - 1985
Engineering Technician, Ford Motor Company	1978 - 1981

* Techna Corporation, Ann Arbor, Michigan

Responsibilities as Environmental Engineer include design and implementation of site assessment programs at contaminated industrial and waste management facilities, environmental sampling, regulatory compliance programs, liaison with regulatory agencies, and environmental audits. Activities have included management of site assessment programs, design of remedial programs, and negotiations with regulatory agencies concerning site assessment and remedial action program requirements.

* Roy F. Weston, SPER Division, Romulus, Michigan

Performed environmental engineering, management, and safety services as a member of the Technical Assistance Team (TAT) for the USEPA Region V. Responsibilities included site assessment and site management activities at Superfund NPL sites and emergency response sites. Principal activities included design and implementation of site assessment programs, management of site activities including sampling and analysis, remedial actions, safety and health procedures, and subcontractor activities. Other activities included soil and water sampling, hazardous waste consolidation and sampling, data interpretation, and reporting. Sites included PCB contamination areas, abandoned hazardous waste sites, chemical spills, and industrial drum piles.

* Environmental Research Group, Inc., Ann Arbor, Michigan

Performed a wide variety of environmental regulatory compliance services for industrial clients. Specific responsibilities included project development, implementation, and reporting was well as regulatory interpretations and liaison with regulatory agencies. Activities included preparation of RCRA permit applications, development of hazardous waste management and minimization programs, preparation of wastewater discharge

permits, and management of NPDES effluent and RCRA groundwater monitoring programs. Other activities included sampling of soils, wastewater, groundwater, process streams, and point source air emissions as well as quality assurance monitoring of asbestos abatement activities.

* Ford Motor Company, Fuel Systems Engineering Laboratory, Dearborn, Michigan

Performed air and fuel flow tests on prototype and experimental carburetors to evaluate fuel efficiency variables. Other activities included evaluation of test data and preparation of test reports for submission to the USEPA.